The Builder.

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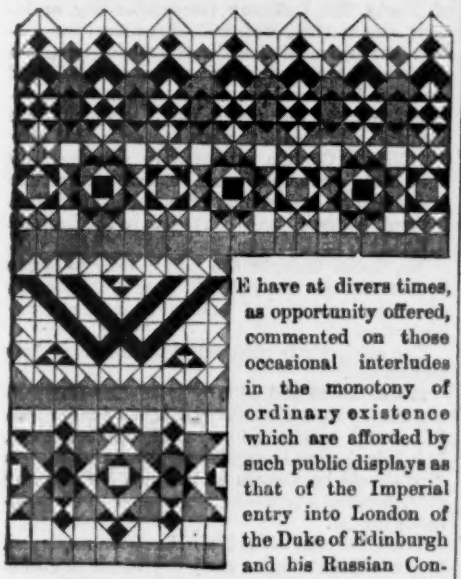
The Imperial Procession—glanced at artistically.



WE have at divers times, as opportunity offered, commented on those occasional interludes in the monotony of ordinary existence which are afforded by such public displays as that of the Imperial entry into London of the Duke of Edinburgh and his Russian Consort. It is not often that such events so happily occur to break the somewhat dull uniformity of modern existence, and to do, as we think, no small an amount of good; and to accomplish, if things were but altered a little, a great deal more good. Thousands upon thousands saw this show or procession, and those who did not see it—and they were not a few even of those who went out for the express purpose—have by this time got it all by heart, in pictorial and written descriptions, so that there is no special need of here telling what it was. But there is one aspect of it which, though not immediately apparent, is not a little important and significant of things as they are, and which calls for comment and careful attention. We mean the *artistic* view of the great show and the long procession, and what is quite as telling, the special surroundings of it, and the special preparations which were made for the enhancing of its importance and splendour. Some things in it were sad indeed to see, and but served to show how much there is yet to be learned, and thought over, and *designed*, before a public, and national, and Imperial Show or "Procession," can be made what it ought to be. We ask a little attention to it, and to a thought or two of what might be with but a little more of artistic cogitation *the next time!*

In glancing at such a subject as this, it is almost necessary nowadays to argue, more or less, for its importance; for there are not a few people who positively object to displays of this sort, and consider them as more or less trifling,—simple waste of time and means. In the old days this feeling was precisely reversed. *Shows* and *processions* and public displays were then events as necessary in human existence as they are now rare and out of the common routine of things. True, everybody does not think this should be the case; for the present Prime Minister, who ought to be an authority, but a short time back said, and we cite his own words,—"That the spirit of civilisation in the nation cannot be sustained if its symbolic representation in the usages of the State be neglected." In other words, it is necessary to make visible and striking what is in reality but a simple and necessary act. The State can go very quietly, if it wills, from place to place, from the City to Westminster, and without any sort of display or show; but it may also perform the same act *with* very great and very magnificent display. In old days people seemed to live almost for things such as these; and not only so, but were at the pains to *record* them afterwards in all-enduring marble and impenetrable bronze. To forget them was impossible, and one of the great questions of the future will be, doubtless, how far and in what way to carry this idea into actual practice. No frowning-down of these things can, it is certain, do away with them, as the last week's display proves. People will have a something or other to look at and to be pleased with, and they ought to have it.

This then being so, the next thing to determine is, how best to do the work, and how best it can be made interesting and instructive, and refining to the general public mind; important questions, not to be settled in a moment, and opening out into quite new fields of artistic thought and action, could we but come at them. A public "show," or procession, or royal and imperial progress, divides itself naturally and necessarily into three distinct and quite separate items; viz., the procession itself; the *streets*, or ways, through which it goes; and its *record* or memorial afterwards. A few words then on each of these, as things now are, and were last week, artistically looked at, may be useful. We are almost inclined to abandon the procession itself in a sort of despair, for "processions" are, year by year, almost resolving themselves into simple displays of long lines of horse and foot soldiers. There were in the imperial procession but six carriages in all; and, what is more, and it is significant of the practical utilitarianism of the time, even the carriages, by degrees, are getting to be more and more sombre and subdued in colour, and plainer and simpler in make and build; so that in them there is but little to distinguish them from the ordinary carriages seen on all court occasions. The old-fashioned and quaint "State coach" is in its way a work of art, and a something which can be painted and drawn from, and sculptured; but an improved and fashionable cariage cannot. In the good old days of Queen Elizabeth, processions were possible and artistic, everything harmonised, and all in them made up, however quaintly, a compact show. The forms of the carriages, their colour, and decoration, the harness of the horses, and the costumes of those who filled these carriages, all went together, and made up one quaint and characteristic picture. The military item in such a show formed but a part of it, and a harmonious part; but in these modern displays the main body of the show is one item, the military another: there is little or nothing between them. In a right Royal progress, surely, it is worth while, if the thing be done at all, to do it well, and to put as much as is possible of artistic skill and feeling into it, to make of it an extempore picture, living and moving as long as it lasts; returning, may be, to common things next day. If it be a good thing to look for an hour or two at Royal Academy picture-shows of the old-fashioned, the quaint, and the forgotten, on dead canvas surfaces; then it may be good to look, too, now and then, at the living picture in the streets. Would it not be an "improvement" to organise a special apparatus for Imperial and processional purposes, always ready, and really suitable for the work, and all designed harmoniously in form and colour?

We could well go on and say a good deal more, and by going into detail a little, perhaps afford a hint or two. We pass on to the other item in the show, viz., the streets themselves, and to the efforts made to convert them into processional thoroughfares, or ways through which the long procession might somewhat worthily and suitably and harmoniously pass.

In the first place, we must need leave the houses and lamp-posts to themselves as they now are; for to "improve" the streets would be almost to rebuild the houses in them. Street house-building is still a problem—perhaps a distant one—to be worthily solved. Regent-street and the Quadrant form perhaps the brightest highway in London; but the architecture of it can hardly be said to be more than plaster covering to plain brickwork. The modern plan, too, of piling the whole front of the house on a sheet of plate-glass, with here and there a thin brass rod to carry it (in appearance), is only to be defended on the score of pure utilitarianism: to make the very utmost of the show shop-front. This disappears, however, in a great measure on procession days, from the fact of the wooden temporary fixtures and supports to balconies and stands. And the question then comes, can the plain and ungainly house-front be made really artistic by any amount of temporary decoration fixed to it for a few hours? Can a real work of fine art come of such temporary expedients, however worthily done? All sorts of efforts were made along the line of route to do something, and at almost every degree of cost; but it was barely possible to find a single one of them which could be called really "artistic." We would name specially but one—it may be in the recollection of a reader here and there—the China-shop in Waterloo-place; as plain a house as can be,—so the architecture did not help it, but the "decoration" most certainly did. Simple heraldic banners hung from the sills of the windows, and festoons of cloth—Imperial colours—from the cornice of the house. We specially name this from the fact of there being so very little of it; but that little doing a good deal of work: there was quite enough. Nothing could exceed the awkwardness of the putting out, in all sorts of accidental places, all kinds and colours of little flags of no special significance,—toy-shop work, if hardly so good. The greater part of it contemptible. Would not a few large and well-drawn upon flags, regularly disposed, be more to the purpose, and most surely far more artistic; and as a whole, when seen together, down the street, far more effective and pictorial? These might, too, with ever so little thought, be made to tell a good story; but a somebody must do it. Nothing can be more effective and telling in such shows than good flags, and it is a pity that the very most should not be done with them, and that they should be not only *artistic* but *significant*. The same, too, may be said of the festoons of flowers, very well made some of them; but should they not also have a meaning, and with a sort of *architectural* sense of order and method in their distribution? Not hung up from almost anywhere that a nail or hook presents itself, from which they can by possibility be suspended. Nothing can be more effective, when well and judiciously placed, and all antiquity shows that the "festoon of flowers," is a worldwide idea, and has been brought into service everywhere, and by every race, and made to decorate, in some way or other, all architectures. It is a beautiful art-thought, but good sense, and the artistic sense, must guide to the use of it, and find a good place to put it; and what is perhaps a more difficult feat still, say when to forbear, and where *not* to hang a festoon of flowers.

Another somewhat remarkable feature in this display was the exhibition here and there, as at the top and bottom of Regent-street, of—what shall we call them?—triumphal stands; with evergreens, and huge plaster statues and busts; the evergreens in some places positively hiding from view the said busts. These things seemed to take people not used to it a little by surprise.

In the general display of flowers, evergreens, flags, coloured cloth, and all else, the plaster figures helped to fill up space; but what they all specially meant, or were intended to signify, passes comprehension. We looked again and again at them, and at some old, very old, friends of ours,—no less than at a pair of the supporting caryatic figures from the lateral porticos of the famous temple of Erecthæus at Athens,—truly startling to contemplate. They did not support the cornice of the "stand," as they should have done, or indeed anything; but simply stood there in Regent-street,—may be, by way of theory,—to illustrate the word "welcome" so conspicuous everywhere. From old Greece to Venice, for we borrow from everywhere,—nothing can be better in idea for bright festive purposes than the "flag-staffs" as seen before the front of St. Mark's. Notable works of art they are, and made out of right good materials, and in proportion to the dimensions of the building they stand before. How different those wretched things down Regent-street, and along the route of the procession; how different the material used, the decorative art on them, and not least, the pedestals on which they stood. But who will compare the wealth of Venice, even at its best, with the wealth of modern London, or even of Regent-street? How very much is there to learn yet in the way of things artistic,—artistic in their very nature. But the question comes, cannot a lesson be drawn from these industrious and patriotic doings? And it strikes us that one good might at least suggest itself from them; and it is, that in all the individual cases which go to make up the whole of these great and expensive shows, special professional aid should be at least encouraged. Such displays, involving both constructional and decorative, and *coloured* decorative art, might well employ, though so temporary, the highest kind of professional ability. All know how much Inigo Jones did in this occasional and festive way, and Vanbrugh, and not a few others, even in these days. The subject calls for it, after the late experience, and it must have needs forced itself on the minds of many who went and carefully noted what they saw. We are here speaking more especially of the street decorative work, and the attempts at colour every here and there visible. We may allude to one special piece of coloured decoration in Regent-street, with a somewhat striking effect, had but a little more judgment been used; and that was at a carpet warehouse. Fine specimens of Oriental fabrics hung from the house, as if to dry, or, as the day went, to get wet. Had they been hung up and exhibited with any, the smallest, amount of judgment and taste, quite a colour lesson would have been taught, showing how the brightest colours may be made to harmonise, and may be brought into service to decorate a building. It was a fine opportunity, had a little art knowledge been brought to bear on it. Our suggestion would therefore be, to employ all along the highway a professional artist, here and there *next time*.

THE SUBSCRIPTION TO THE INSTITUTE OF ARCHITECTS.

SOME very strong letters have reached us finding fault with recent expenditure at the Institute of Architects, and condemning the proposal which has been placed by the Council before the members to raise very considerably the contributions, entrance-fees, and subscriptions paid by members. It was discussed rather pointedly at the recent meeting of members only, and was adjourned for further consideration at the next annual general meeting. Judgmatic friends of the Institute will, we think, advise the adoption of some other means of meeting any little financial difficulty that may exist. It would be very inexpedient, as it seems to us, to raise the amount of payments as proposed, and would lead, we are assured, to the secession of a number of members, not because they could not conveniently pay a higher subscription or composition, but because they believe they get so little in return for the present payments.

The Monday evening meetings at the Institute have a very different character now from what they had in old times; when everybody was glad to see everybody, and the greatest geniality prevailed. The members who had worked early in its interest were recognised and treated with consideration, and men of mark and weight, known and trusted by the public, sat round the president.

An account of some of the meetings of late days, cold, hard, and spiky, would not be attractive.

Raising the subscriptions is not the way to bring about the desired improvement. The Council must try again.

MEDALS AND PRIZES OF THE INSTITUTE OF ARCHITECTS.

IT has been resolved that the Institute Silver Medal, with 5*l.* 5*s.*, be awarded to the author of the drawings illustrating St. Mary's Church, Warmington, and distinguished by the motto "*Festina lente*." (G. Dale Oliver, of 150, Stanhope-street, Regent's Park.)

That in the same competition a Medal of Merit be awarded to the author of the drawings illustrating St. Mary's Abbey, Buildwas, Salop, and distinguished by the device of a Bird within a Circle. (Walter Talbot Brown, of 20, Wood-street, Northampton.)

And that the drawings submitted in the same competition under the motto "*Immer vorwärts*," and illustrating Bayham Abbey, Kent, be honourably mentioned. (W. T. Whyte, of 45, Doughty-street.)

That the Essay Prize be awarded to the author of the essay on "The Architecture of London in the Sixteenth Century," distinguished by the device of a Cross and Circle. (A. T. Taylor, 16, Oakley-road, Church-road, Islington.)

That a Medal of Merit be awarded to the author of the essay on "Vaulting," submitted under the motto, "*Labor ipse voluptas*." (T. H. Eagles, Associate, of Cooper's Hill, Staines.)

That the Student's Prize in Books be awarded to the author of the design for an Oak Ceiling, distinguished by the motto, "*Labor omnia vincit*." (H. R. Perry, 9, Seymour-street, Green Park, Bath.)

The Soane Medallion was not awarded this year, no design of sufficient merit having been submitted.

THE "SHAFTESBURY PARK ESTATE," BATTERSEA.

THE annual general meeting of the Artizans', Labourers', and General Dwellings Company has been held. The report stated that the balance-sheet, duly vouched by the auditors, and the certificate of value of the property erected by the company, were perhaps the best indications that could be given of the hold which the company had obtained on the public mind, the solid nature of its investments, and of the measure of success that had already been realised. The company had tested both modes of building—that of letting out the work to contractors and that of using associated labour only, and the latter had been found to be better than the former as regarded the quality of the work, the saving of materials, and the question of cost. The company had now its workshops and steam saw-mills, and obtained all the advantages of trade by purchasing the necessary materials in the best and cheapest markets. Some hundreds of houses had been erected on the Shaftesbury Park estate, and about 300 more were in process of erection. All the houses that had been finished had been either sold or let. Building on the estates at Birmingham was being proceeded with in a satisfactory manner, and these estates, when fully utilised, would prove a good source of income to the company. The share capital had greatly increased, there being now in hand 112,196*l.*, and the deposits 23,603*l.*, together 135,799*l.*, and the amount of business transacted during the past year had been greatly in excess of anything heretofore accomplished by the company, whilst the results had been more encouraging. The directors recommended the declaration of a dividend at the rate of 6 per cent. per annum, leaving a balance of 2,734*l.* to be carried forward. The report was adopted and the dividend declared.

We have seen the houses at Lavender-hill, Battersea,—long straight ranges of two-story buildings, varied by hoods over the doors, and occasional turrets, the effect of which, so far as their pointed roofs are concerned, is much interfered with by the wall raised to cut them off from the adjoining house, in accordance with the requirements of the Building Act. Externally, the houses seem well built, and have a very respectable appearance. There is a temporary lecture-room at the commencement of the estate.

The situation of the buildings seems unfortunate, the only approach at present being by two dangerously steep descents, with, so far as we know, no other carriage way out. This, however, will doubtless come hereafter. Gas is needed in the streets, and the paths are too narrow to admit of trees.

We should be glad to receive particulars of the exact terms on which the houses are rented and bought.

THE BOARD OF WORKS.

BALCONIES AND STANDS.

AT the last meeting of the Metropolitan Board of Works, Mr. Vulliamy (superintending architect) stated that, under his directions, the district surveyors of the Board had inspected all the balconies and other structures on the line of route of the Royal procession, and in the structures so inspected not a single accident had occurred. It would appear, however, that near the Nelson Column a temporary structure had been hastily put up by some costermongers. The Board had no opportunity of seeing it, and it fell. Several persons were conveyed to the hospital suffering from fractured limbs.

Mr. Roche thought the police were to blame in this matter. They should have prohibited at once the erection of stands of a temporary character.

The subject was referred to the Building Acts Committee.

It was mentioned at a previous meeting that the surveyors on whom the task of inspection fell would receive no payment for their work. Is it fair that an enormous responsibility of this kind should be thrown upon them without any compensating advantage? It seems to us manifestly unjust.

The Chairman of the Board has been requested to give notice upon an early day of his intention to introduce a Bill into the House of Commons "for consolidating, with amendments, the Building Acts relating to the metropolis; for regulating the formation of streets and of sewers and drains in the metropolis; and for other purposes relating thereto."

It appears scarcely likely that the House will be able to give attention to the subject in the present Session.

A JOKE OR TWO FROM A BUILDER'S NOTE-BOOK.

EVERY bricklayer has a Bob, which he hangs first and kills afterwards.

Staircase-hands make deep well-holes, but there is never water in them, although everything that rises and winds about them or above them is on a spring.

It is strange that dishonest plumbers should be always taking the lead in buildings; and, though often sent upon the roofs to work, are generally found "laying" in the gutter.

Joiners and cabinet-makers are adepts at shooting; but, though they fail to kill hares, they succeed admirably in running plenty of rabbets down.

A hand-saw is a bad graving-tool, but a first-rate instrument at "cuts."

Engineers are said to be civil, but they are well known to be deep-designing and undermining fellows; and, though not generally swearers, they never hesitate at a blast or two.

Surveyors are men of quantities. They measure every builder's work by their own standard; and, though they are always "taking out," they are never willing to be "taken in."

Steeple-Jacks ought to make good floaters for Bubble Companies, as they can fly their kites well; but, though they climb to a towering height, they soon dip to their proper level.

Carpenters and joiners are always tongueing their work; and, though it screeches under the operation, it has never the courage to speak out in return.

Smoky chimneys, like swindlers, refuse to honour their draughts, no matter in what way the wind is raised.

Plasterers have some peculiar tastes; they are fond of good hawks, swimming beds of mortar, and floating walls; and, though they cannot fly themselves, yet even while at their work they can run well.

Sash-hanging, it must be allowed, is a most barbarous exhibition. Only think of a house-carpenter dragging a poor mouse through the groove of a pulley-box with a string tied to its tail!

A rampant handrail is eased by twisting its neck, and then horsing it to see if it rides well under the operation.

Jerry-builders' dwellings tumble down like houses of cards, because they are mostly built by the aid of a pack of knaves.

Stirring sticks are always found in "strikes" jumping about like "chips" in porridge.

White-smiths are often very black-smiths, and both are said to be evil doers, for they are not only constantly on strike themselves, but they invariably employ strikers to help them in their forging operations.

Some people carry their lanterns about to see their work, but architects make their roofs carry lanterns, and are often shabby enough to use borrowed lights.

THE CHAPEL AT CHISLEHURST.

THE mortuary chapel at Chislehurst, the scene of the late remarkable demonstration, has been erected from the designs of Mr. Henry Clutton, architect. The style adopted is that of thirteenth century. Circular and segmental arches are introduced. The chapel opens into the church by a double arch supported upon coupled columns of marble with carved capitals, and is lined throughout with ashlar work. The vaulting is also constructed of stone. At the east end is the altar, the reredos of which is formed by a large niche, with a sculptured canopy above it.

The chapel is lighted by three windows on the north side, and a pretty rose-window at the west end, and has, in addition to its access from the church, a small doorway in the west end. The floor is covered with green, chocolate, and red tiles, highly glazed, manufactured by Craven, Dunnill, & Co., Jackfield, Salop. In the centre of this chapel is the sarcophagus, of Aberdeen granite, the gift of her Majesty the Queen, formed out of a single block of fine colour; a second block forms the lid. The exterior of the chapel is constructed in ashlar, and the roof covered with black tiles. The exterior is somewhat ungainly.

PROPOSED NEW HALL FOR HACKNEY.

THERE is a project for the establishment of a public hall in Hackney, in order to provide the residents with a suitable place for meetings and entertainments.

It is proposed to raise a capital of 10,000*l.* in 5,000 shares of 2*l.* each. No adequate accommodation of the nature it is intended to provide exists in the district at the present time. The scheme is to erect a hall capable of holding upwards of 1,000 persons, and adapted for public meetings, scientific, literary, and musical entertainments, with other adjoining rooms of smaller capacity for the purpose of accommodating clubs, committees, and private parties, so that every kind of meeting may be provided for. It is stated that a convenient site has been obtained opposite St. Thomas's-square, having a frontage of 160 ft. to Mare-street and 140 ft. to London-lane, possessing great advantages in the matter of providing facilities for ingress and egress, and being easily accessible from the City and the surrounding neighbourhood.

Already 2,500*l.* of the required capital have been guaranteed.

Mr. St. John Ingram, architect, at a recent meeting, submitted preliminary sketches of the intended building, and gave explanations respecting the terms upon which the site was to be acquired, and it was resolved to call, by advertisement and circular, a public meeting, and also that Mr. John Holms, one of the representatives of the borough, be requested to take the chair.

CAN ART BE TAUGHT?

SIR,—A "Science and Art Student" has somewhat misapprehended the precise purport of my first letter on the above subject. If the condition of painting and sculpture are unsatisfactory it is customary to throw the blame upon the art schools. Now, the art schools are more numerous and better appointed in England than they ever were in the palmiest days of Italian painting, and yet they fail to produce greater, or even equal, results. Again, the great Italian masters made Italy one academy, a museum of art from north to south; but, for all this, where is modern Italian painting? It is, therefore, evident that the finest examples and the best appointed schools are in themselves inadequate to create a national school of art unless the human elements, the humanity of the scholars, be of the right kind; and even then, perhaps, not without a liberal encouragement to incite to industry and emulation.

Why is it that one industrious student becomes a true artist, and another equally industrious student, and with equal opportunities of study, never does? Clearly it must be some inherent difference, an incompleteness in one nature compared with the other. The results of the art schools will, therefore, be greater or less as the humanity of the student is either fit or unfit to make the proper use of them. I do not say that we are to shut up the schools, but that we shall have to wait for grander results till the fitter natures are more numerous. The artist, in fact, cannot be educed by the "*labor*" alone, if the "*ingenium*" be wanting. I therefore conclude that our first endeavour should be to develop human nature to its true standard.

W. CAVE THOMAS.

"CAN art be taught?"—who doubts it? What in the world is there to be taught if art be not the very alpha and omega of all teaching, from the time a baby learns to lift a spoon to its mouth? A strong-lunged, well-taught, and thoroughly-drilled she-thing will sing you the most difficult of operatic airs, expressive of the most exquisite apprehension of what is vocally intense in feeling, and most finished in its method of utterance too. You and I will shriek "Brava! brava!! exquisite! splendid! Who was her teacher?" "Signor Glottiscum Stamina. No pupil did more honour to a great master!"—a courtesy and two bows. Lottie Shaw, who never gained a note of instruction beyond what old Stopps, who plays the village church organ, is her creditor for, quite trembles when she takes seat on the music-stool that Leonora Handelgluck vacates. With pure voice (it may want cultivation), and with soul's strength, she warbles some homely air, "Home, sweet home," or "Annie Laurie." The eyes have it first and then the nose, for tears drop or trickle whilst we wonder if "Art can be taught?" What is the "central type" of it?

JEM.

TRADES MOVEMENT.

Taunton.—A strike is pending in the building trade at Taunton. Three months ago the men sent in a demand for an increase of wages and a reduction of hours, but they have not yet received an answer.

Sheffield.—An advance of 2*s.* per week in wages, and a reduction of hours to fifty-five weekly, have been conceded to the operative plumbers.

Alloa.—The dispute between the masons and their masters has been compromised. The men have commenced work, after having been out about a month. The employers have agreed to pay wages weekly, allowing Saturday as a "lie" day. The wages are now 7¼*d.* per hour.

Hawick.—The master joiners have agreed to advance the journeymen operatives' wages to 6½*d.* per hour, being a rise of one halfpenny per hour.

Dundee.—The ship-carpenters have struck for an advance of a halfpenny per hour.

Kelso.—The operative painters have been agitating for a reduction of their working hours to nine per day, and an increase of wages to 6*d.* per hour. Notice of their demands was given to the masters on Saturday week, and also that if they were not conceded at the termination of a week, they would cease working. A deputation waited upon the masters, when the latter refused to grant the demands, and consequently the operatives are going about idle.

Penicuik.—A meeting of joiners, masons, blacksmiths, slaters, and other tradesmen, has been held to consider the nine-hours movement, and to hear the reports of delegates appointed at a previous meeting to wait on the employers. There was a full attendance of the different trades; Mr. Cutherston in the chair. The reports given in showed that all the employers had agreed, with the exception of Mr. Tait, builder, and it was explained that those in the employment of Mr. Tait were not unanimous in their desire for the new hours, or doubtless they would have got them. The nine-hours system came into effect on Monday.

Edinburgh.—An adjourned meeting of painters has been held, Mr. A. Brian in the chair. It was stated that an evasive reply had been received from the employers to the communication forwarded in accordance with the resolution passed at last meeting. Mr. James Aitken then moved that all legal and fair means be used to secure the advance of one penny per hour. A resolution was passed on the motion of Mr. Buchan, seconded by Mr. R. Purvis, adjourning the meeting till the 24th inst. After a good deal of discussion, it was also agreed to write to the masters again, requesting a reply to the application for an advance of wages.

Strikes in New South Wales.—The correspondent of the *Times* at Sydney, writing on January 17th, says:—

"The workmen here follow the European model. Combinations and strikes are quite the fashion. The cabmen must follow the Paris example, and do battle for their rights at the point of a strike, although no reason existed for the act since the Transit Commissioners were as desirous of doing justice to the cabmen as to the public. The strike of the ironworkers in the leading engineers' shops is a matter of more consequence. Ten or twelve large establishments are closed, with abundance of work on hand. The circumstances are these:—On the 11th of October last the workmen, through their delegates, gave notice to the masters that, on and after the 1st of November, they should consider eight hours to constitute a day's work. It was also demanded that the hours should be from 6 a.m. to 4 p.m. on Mondays and Fridays, and from 6 a.m. to 1·30 p.m. on Saturdays during the summer months, with 45 minutes for breakfast and 1 hour for dinner; and in winter, that the hours should be from 7 a.m. till 5 p.m. on Mondays till Fridays, and from 7 a.m. to 1·15 p.m. on Saturdays, with 45 minutes for breakfast and 45 minutes for dinner. In addition to this reduction of time, an increase of wages was demanded equivalent to from 14 to 16¼ per cent. upon current wages. Opposition appeared futile at the time, for a great deal of work was on hand, and the terms were agreed to unwillingly, one strong objection being made to the unequal apportionment of the eight hours by the meal breaks. This apprehension was justified by subsequent experience. The new division of time proved economically injurious. In dividing the day into three unequal portions, it was found that the two hours allotted to the afternoon were wholly insufficient for the process of casting then conducted. The masters consequently gave notice that, on and after the 2nd of January, the hours of labour would be from 7·45 a.m. to 12·15 p.m., and from 1·15 p.m. to 5·15 p.m. The only change proposed is to divide the day into two, instead of three, portions; but the men refuse to agree to it."

INCOMBUSTIBLE WOOD FOR SHIP AND HOUSE BUILDING.

SEVERAL attempts have been made at different times to render timber uninflammable. A new method has recently been tested at Plymouth. Some interesting experiments were made at the Dockyard, Devonport, before Admiral Sir W. King, K.C.B., and other officials, by order of the Lords Commissioners of the Admiralty, on Thursday, February 26th, and again on Thursday, March 12th. In one, a large heap of the prepared timber, about 2 ft. high, and 7 ft. or 8 ft. in circumference, placed on large iron sheets, was saturated with paraffine and set on fire: as soon as the paraffine was consumed the fire went out; the timber was then examined, and found to be scarcely injured; whereas a similar heap of ordinary wood, treated in the same manner, was completely reduced to ashes.

We understand that the inventor is a clergyman,—the Rev. Dr. Jones, principal of Harewood College, Tavistock,—and that the process is inexpensive.

OVERCROWDING.

SIR,—In referring to my correction of your reviewer's statement of the law on overcrowding, you ask whether I have enforced the clause in the Sanitary Act of 1866, which makes "any house so overcrowded as to be dangerous or prejudicial to the health of the inmates" a nuisance? In one sense I have enforced it frequently, by notifying the landlord of the existence of the nuisance, and where I have done so, I have never failed to get the nuisance abated. I have, therefore, had no opportunity as yet of enforcing the law on this subject before the magistrates. If you will look at page 50 of the "Digest" which you quote, you will find the definition to which I have referred. I may add that I am very unwilling to exercise the power which the law gives on the subject of overcrowding, except in very gross cases, so long as it is due, as it so largely is in rural districts, to a crying insufficiency of house accommodation, which is the parent of that as well as of numerous other evils.

A MEDICAL OFFICER OF HEALTH.

Royal Architectural Museum.—The Council of the Society of Arts have voted a donation of 20*l.* to this museum, to assist in establishing the classes for artizans for technological instruction, lately set on foot in this institution.

LECTURES ON ARCHITECTURE.

BY EDWARD M. BARRY, R.A.

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I SPOKE to you last week of the various modes by which the study of architecture may be approached, whether from its archæological, its scientific, or its artistic side. In strictness it might seem that the last of these aspects is that on which alone it is legitimate to dwell in an academy of arts. Architecture, however, is so purely artificial, that it is impossible to understand it properly, without entering into those historical influences and those materialistic limitations, which affect so greatly its form, and character.

I asked you in my last lecture to devote a short time to the consideration of the various claims of architecture on the admiration and interest of men. I propose to-night to dwell on certain tendencies of our own time, and to refer to some modern revivals which may throw light upon the question of the ultimate form which our art is likely to assume.

There can be no difference among architects in replying, that any style of the future must be based, more or less, on those of the past, or on one of them. Here, I am afraid, agreement will cease, and we shall find ourselves face to face with the question of Gothic, or Classic.

Sir Gilbert Scott has lately alluded, in this place, to the division of architects into two camps, a remark he probably wished to be received with some qualification, as there can never be wanting bonds of friendship and alliance, between all true followers of art.

No one who cares for architecture at all, can speak disrespectfully of the great Mediæval revival which this century has witnessed; and its very completeness seems to suggest that the time may have come to inquire what is likely to be its result. In making this inquiry it is not easy to avoid being misunderstood, so hot and eager have been the contentions of opposing schools. It is unnecessary, however, to contend for a rigid uniformity of taste, and in speaking to students no one would wish to repress the enthusiasm which sits so gracefully on youthful neophytes. A want of interest is the parent of decorous dulness, and there is no silence like the silence of the grave.

Where there is earnestness there will be controversy. It has ever been so, and in matters which touch mankind's innermost feeling more than art can ever do, it may be doubted if the will to press dogmas even to their logical result of persecution, has ever been limited, save by the absence of power to carry it into effect. We must, therefore, make every allowance for anything which may appear to sober observers to have been extravagant, in that zeal which has revived an almost extinct enthusiasm, and has invested our architecture with so much that is poetical and interesting. At the same time, we may ask, if the day has not come to lay aside that intolerance of opposing views, which has too often found a place in architectural discussions. It may surely be possible to prefer, for modern use, classic art to its Mediæval sister, or even to dwell on the convenience of Renaissance, without giving occasion for the use of terms more fittingly reserved for moral delinquencies, than for artistic preferences. It is in this respect that a lecturer, not unacquainted with the difficulties and responsibilities of practical work, may possibly have some advantages over professors guided by theory alone, as he will have learned too much from the great teacher Experience to cherish the belief that his own views are infallible, and that he is therefore entitled to pour out his contempt on those who differ from them.

Professor Cockerell showed his moderation and breadth of view by the manner in which he dealt with the Gothic revival of his day; and Professor Scott only followed his example when he so lately insisted on the value of the study of the architecture of Greece and Rome.

It has been my lot, from early associations, to be mixed up with the discussions on both sides, and to have some experience of both camps. A learner under Professor Cockerell, and one to whom I owe a deeper, because a filial reverence, I can also remember the delight with which I devoured Pugin's "True Principles of Christian Architecture," and the other works by which he strove, often with exaggeration, often with humour savouring of burlesque, but always earnestly, and with the vigour of genius, to recall his countrymen to what he deemed their true artistic allegiance.

No one, therefore, is less likely than myself to wish to do scant justice to the remarkable movement which, during the last thirty or forty years, has made so great a mark on our architectural history. Moreover, nothing can be further from my purpose in asking you to consider well the lessons taught by the study of the past than to discourage originality; for you may depend upon it that in an art like ours originality can never spring from ignorance, and yet possess any artistic character. Ignorance may produce buildings which may startle the world, but it will not add to the masterpieces of art.

The young architect must therefore study his art historically, and thoroughly, before he can hope to practise it successfully. With knowledge, will come its necessary consequence—responsibility,—and it is right and proper that he should form a definite opinion on the claims of different schools. I am, however, much mistaken if his studies, provided they are undertaken in a proper spirit, will not teach him moderation of judgment in estimating the merits or demerits of those forms of art which have been the admiration of centuries, though they may not happen to fall in with his own special tastes, or with the fashions of the day.

In thus speaking, I do not wish to confound a momentary fashion with the spirit of the age in which we live. All healthy and good heart must be penetrated by the latter, while resisting the ephemeral influences of the former. What would be our interest in the Venetian school of painting if Titian and Tintoretto had ignored this principle? It is the same in architecture. The best examples will be found to have been the legitimate fruit of the aspirations of their time, whether that time was ruled by devotional, political, or material influences.

In our own days architecture has, I fear, fallen somewhat short of its mission in this respect; and the revivals, whether Gothic or Classic, which have marked its modern history, will sadly perplex any future archæological inquirer into the ways and customs of the nineteenth century.

Our present desultoriness of practice, and consequent waste of strength, in forwarding the progress of art, is no doubt the penalty we pay for our more extended knowledge of the doings of all ages and countries; and it is difficult to suppose that any universal agreement will ever again be attainable on points which must remain questions of individual taste. But some general principles, such, for example, as truth of construction, are common to all forms of good architecture, and in the study of such principles will probably be found the best chance of progress. Beware of being led astray by idle fancies of a new style. Styles grow, but they are not made. Form your practice, if you will, on the type which appears to you, after careful thought, to be the right one to follow. Apply to it those principles which have ever distinguished good architecture in all styles. You will find these to be Beauty, Truth, Proportion, Fitness, and the like. Working on this foundation, patiently, carefully, and with a determination to do your best, you will fulfil your mission as an artist, and promote the development of your art, far more than in seeking for novelties, which first vitiate, and then pall upon the taste.

Do not, however, think that your first duty is to decide on the style of the future; be diligent to neglect nothing that can add to your knowledge of the past; be careful that you do your best in the present, and the future will take care of itself.

I have said that you cannot safely neglect the spirit of the age in which you live. Of course, I am not speaking to those who are satisfied that their own times are so bad, that they should shun their influences, as they would the contagion of the plague. These are the monks of the artistic world, and have, no doubt, a right to their own opinions, although we are not bound to follow them.

Architecture, however, is the offspring of our daily requirements, and it is not the business of the architect to separate himself from his own time. We are all in some sense the worshippers of olden days. The glories of the past were the song of poets long before Horace, and will doubtless continue to be so, as long as time shall last. Can any of us, and least of all those who are advancing on the road of life, resist the spell? What years were ever like those of our youth? What days so sunny? What joys so unalloyed? Oh! the good old times! will they never return? Alas! no, the flowers fade, the world grows old, and nothing can stand still. We find ourselves, as it were, students of the fallen greatness around us. It is for us to learn by its teaching, not to copy its defects, and we shall misread the lesson if we try to force things backward, and waste our time in vain endeavours and regrets.

In learning from experience, then, the architect must not forget that we live in the nineteenth century, and are of it. Is this a misfortune? Do you think that all goodness died out in some vaguely defined past? Do you suppose there is less of real religion, honour, patriotism, and public virtue now than then? We are sometimes asked, in desponding accents, "Are we better than our fathers?" in a tone which implies that a negative is the only possible answer. Every epoch in the world's history, like every stage in our own life from the cradle to the grave, has its own trials and temptations, and the nineteenth century has, of course, enough to answer for; but to estimate progress on a journey we must not look only at a single milestone, and can we conclude that nearly nineteen centuries of Christianity have left no mark on the world?

All ages have done honour to the glorious three hundred at Thermopylæ; but do you think the six hundred of the Balaclava charge will be forgotten? Shall we reserve our sympathies for the march of the ten thousand, and depreciate the exploits of our own people in the Indian mutiny? Or,—not to speak of the gallant handful of heroes in Africa, in whom our interest centres at the present time,—can we forget the grand spectacle of the patient endurance of our countrymen and countrywomen during the Lancashire cotton famine, when millions found themselves destitute by no fault of their own, and yet resisted all temptations to seek to alter the national policy, because they believed it was right?

I have been led into this train of thought to-night, because it seems to me that the great question which architects have now to ask themselves is this,—Are we of the nineteenth century to compress our ideas and architectural forms, within the limits that prevailed in the thirteenth or any other century? Are we not rather to seek to march with our own time, as the old architects did with theirs? These are problems which each student must think out for himself; and on the answers which he may be able to give to them, will depend, not only his own success, but the very future existence of architecture, as distinguished from archæology.

After these introductory remarks, our attention may now be given, for a short time, to the course of architectural practice in this country, since the building of St. Paul's. In a former lecture, given some years ago during the temporary absence of your late Professor of Architecture, I took occasion to trace rapidly the stages which had been passed previously to that important architectural event.

The revival of classical literature in the fifteenth century led, as most writers agree, to the change that then took place in architectural art. The great impetus communicated by the fall of Constantinople in 1453, and the previous preparatory efforts of men like Petrarch and Boccacio insured a welcome for the new revival in the classic land of Italy. Thence it soon spread over Continental Europe, although it did not fully reach England till about a century later. We know that Queen Elizabeth prided herself on her classical knowledge; and the list of Lady Jane Grey's acquirements reads like a synopsis of a modern university examination. The courtiers of James I., moreover, were never so courtly as when they lauded the classical achievements of "the Royal Pedant." The literary tastes of the Court and of the upper classes led naturally to the adoption of classical forms of architecture, for in those days there were no influential classes outside the great Court circles, who claimed to be patrons of art, and could have turned aside the tide of fashion.

The influence of Inigo Jones as the Court architect of the day, was consequently for a time supreme, and during the reigns of the Stuarts, previous to the Commonwealth, many remarkable buildings were erected by him. We all know the fragment of his design for Whitehall Palace, which we call the Banqueting House; and most of you are probably familiar with

* Lecture II., delivered March 12th, 1874.

his plans for the whole structure, which, if erected, would have been among the largest and most magnificent buildings of the world.

During the civil wars, and the unsettled days of the Commonwealth, art was not likely to flourish. We cannot fancy Cromwell addicted to many of the graces of life, and his demeanour towards art would probably partake less of the sympathy and courtesy of Mæcenas than of the rougher vigour of the camp. The Restoration, however, brought back a court still imbued with classical tastes, and a king fresh from the influence of the Grand Monarque.

When we bear in mind the tame monotony, and the elaborate littleness of Versailles, which was erected at the same time as our own St. Paul's, I think we shall find fresh reason to recognise the judgment, taste, and skill of Sir Christopher Wren. We read in the "Parentalia," that the first stone of St. Paul's was laid in 1675, and about thirty-five years later, the top stone of the lantern was placed by the architect himself. Versailles was erected from 1664 to 1685; and considering the intimate relations which existed after the restoration, between the French and the English courts, we can easily understand the influence which French fashions in architecture might have assumed, if Wren had been less a master in his art, than was happily the case.

I do not know that we have much to say in favour of our restored English court, in those days; but at least there was some independence left in English society. In France, we see the picture of Louis-le-Grand, with an array of chamberlains, mistresses, Jesuits, and lacqueys, with a coat embroidered with diamonds, a wig powdered with gold-dust, and red heeled shoes, which lifted him four inches from the ground, "that he scarcely seemed to touch." What could such a man do wrong? Himself the State, what homage could be too abject for the tastes and will of so grand, noble, and gracious a monarch? How could his judgment of architecture be other than infallible to the thousands of courtiers, who thronged the Œil de Bœuf; seeking to imitate their grand exemplar, though at an awful distance, as we may fancy a star emulating the splendour of the sun?

How deserted and gloomy are these vast chambers now! Kings, princes, generals, and courtiers have passed away like a shadow; and the huge pile subsequently dedicated by the "bourgeois king" to all the glories of France, has, in our own day, echoed with the groans of sick and suffering soldiers, and its courtyards have resounded with German bugles, and the hoarse words of command of alien conquerors.

You will find it very interesting to examine the work of Mansard and the other courtly architects of Versailles, and compare it with that of Wren. Time, however, would fail me now to do justice to this subject, and I must leave it to you to follow up at your leisure.

We will pass on to a consideration of the state of architecture in England after the days of Sir Christopher Wren. This brings us to the time of Queen Anne; and I suppose few of us, at any rate until lately, would have been disposed to credit that epoch with any well-defined style. Queen Anne's reign recals to our minds, principally, days of English daring and triumphs on the Continent, childish affectations and intrigues about the Court, and political uncertainties as to the future reigning family of the monarchy.

To Englishmen, the name of Blenheim must always be glorious, and in an architectural review of the day, the palace of a nation's gratitude which bears that name, cannot escape our notice. Sir John Vanbrugh was Sir Christopher Wren's successor in Court favour, but not in architectural genius. With considerable opportunities he failed to found as enduring a reputation. Fond of massiveness, he achieved a certain gloomy grandeur, without harmony of proportion or beauty of ornament. His works are interesting, however, as proving that men were beginning to tire of the fetters imposed by a strict adherence to the Classical orders. At Blenheim, the principal order is not used throughout, and the skyline of the building is effective and broken, in opposition to the tameness of many of the revived Classical compositions. In fact, Queen Anne's time, as far as it developed a style at all, would seem to have done so by breaking away from established traditions, and by encouraging architects to design in less pretentious modes than had been lately fashionable.

Here it is to be feared praise must end, for the details were of a mongrel kind, with bits of quasi-Classical orders, mixed with mullioned windows, and Gothic of a debased character. It was, if anything, a protest against the fetters of a rigid revivalism, and it is possible, from this circumstance, that it may again find favour for a time, although the danger now to be avoided seems to have arisen from the opposite point of the architectural compass.

If this is to be the case, it is probable that its details will be purified, and its forms made consistent with a severer taste, when there will be little to distinguish it from Italian Cinque-cento, or Renaissance.

From Queen Anne's time to the days of the Gothic revival, our architecture has for the most part followed Classic types. Sometimes the architects ventured to dispense with the orders, as did Kent at the Horse Guards, but more often they relied upon them as the great feature of their designs, St. Martin's Church, by Gibbs, being an illustration of the latter kind of treatment.

Sir William Chambers brings us down almost to the present century, as he died in 1796. His greatest work was Somerset House, and though it may not be difficult to find many faults with its design, there is much in it which is worthy of praise. The poorest part is unfortunately that which is most seen, being the river front, which is tame and uninteresting, besides being placed on a terrace too high for a subordinate accessory to the design, which a terrace should always be.

I will not fatigue you by detailed references to the brothers Adam, (who, I believe, were among the ancestors of our late minister of Works,) or Taylor, Soane, and Wilkins, only pointing out to you, in passing, that all these architects worked in the fashionable classic of the day, and did not apparently dream of any change in the public taste. Of buildings nearer to our own day, St. George's Hall, at Liverpool, calls for a word of notice. This was, as you are aware, finished by Professor Cockerell, after the death of its young architect, Elmes, a man of the highest promise and genius. It is certainly one of the most beautiful modern buildings in Europe, and fitly represents the mode of treatment which was popular at the time of its erection.

Before, however, St. George's Hall was finished, a conviction was gaining ground that Greek architecture of so severe a type was inapplicable to our requirements, without considerable modifications. Professor Cockerell, in his practice, fully recognised this necessity, and you will find much to study in the buildings which he erected. I may select as an example, particularly deserving of your notice, the Sun Fire Office, opposite the north side of the Royal Exchange. This is a building evidently well fitted for its purpose, as the central office of a rich and prosperous commercial corporation, and it could hardly be mistaken for anything else. The whole composition is dignified with a sufficient amount of ornamentation. Every moulding and window-dressing bears evidence of careful thought, and displays unmistakably the refinement which belongs to the work of a true artist.

In passing through the City of London, you will see hundreds of buildings erected since the Sun Fire Office was built; but I doubt much if you will find anything better worthy of your attention, or more suggestive of what might be done by architects working on Greek traditions, but not slavishly copying inappropriate forms, only because they are old.

While Professor Cockerell was engaged in working out the principles which he taught from this chair, others, in friendly rivalry, were labouring in a similar spirit, with a view to adapt their architecture to modern requirements. The clubs in Pall Mall are examples of this movement, in which, as you are aware, Sir Charles Barry had no unimportant place. He had early directed his attention to Italian architecture, deeming Greek details too unbending to yield readily to the modifications, which he thought necessary, to make it suitable to the wants of nineteenth-century men and women.

He thought he saw the basis of a style such as he looked for, in the works of the Italian architects of the sixteenth century, such as Sansovino, Vignola, and Palladio; and he worked on this principle, seeking to carry out, what he was fond of terming the Anglo-Italian style.

You will not expect me to criticise his works, but I do not think you will accuse me of filial partiality, if I say that the garden-front of the Travellers' Club is to my mind one of the most graceful compositions of modern architecture in this country. It is simple, expressive of its purpose, and every part is carefully proportioned to every other. Some years ago the stone balustrading was removed from the first-floor balconies, and a meagre iron railing erected in its place. The effect was to destroy the rhythm of the whole composition. The windows were apparently increased in length by nearly a diameter, as the iron railings allowed the spectator to see their lower parts, which were hidden by the stone balustrading as originally designed, and their proportion was utterly destroyed. Happily the Club, on being appealed to, undid the mischief, and restored the balconies to their original appearance; but I have mentioned the circumstance, in order to lead you to reflect on the great value of proportion, and to point out how little differences of detail, which to many may seem unimportant, may make or mar an architectural design.

Sir Charles Barry entered fully into the feelings which dictated the Gothic revival, and as you are aware, carried out his greatest work in that style; but there is no doubt that what he called the Anglo-Italian style, as shown in the Travellers' Club, and Bridgewater House, was the style not only of his youthful predilection, but of his mature conviction.

I have not attempted anything like an exhaustive review of modern architectural practice, but have merely asked you to notice cursorily the various waves of change which have passed over it. Continuing this review, we shall find that we have arrived at a time when architectural taste was to undergo a great revolution, and the Classic was to be succeeded by a Mediæval revival. This revival was at the first, as I pointed out in my former lecture, very much limited to Church architecture, and governed by ecclesiastical influences.

We have seen how the taste for the architecture of Greece and Rome arose with the renewed interest taken in the literature and history of these countries. It does not appear that any such general cause led to the first inclination to Mediævalism.

Walpole, at Strawberry Hill, was one of the first to introduce it between 1760 and 1770, and he soon found followers. Then came the series of dreadful erections which we may stigmatise as Batty Langley, or Strawberry-hill Gothic, which by-and-by roused the ire of Pugin, and were so humorously attacked by him in his "Contrasts." It was a time of shams, — of palaces, churches, castles, and pagodas in lath and plaster. "The first Gentleman in Europe" was contented with a seaside residence made up of pagodas and turrets, crowned with tee-totums and other details appropriate rather to a tea-garden than a royal palace, and Nash reigned supreme over London improvements.

As I have mentioned Nash, it is only fair to say that as regards these improvements we owe him some thanks. He laid out Regent's-street, from its commencement at Cockspur-street, to its termination in Regent's Park. The architecture along this fine thoroughfare shows all the faults of the time, but the arrangement is managed with great skill, and any architect who may now be entrusted with similar work will find much to study with advantage in the plan of the successive squares, circuses, and curves, which mark the disposition of the space. Taken altogether, I know of no such magnificent thoroughfares in any European city, if I except (and that only to a limited extent) the Boulevards of Paris. Nash's designs of the buildings are, as I have said, mean, and unworthy of their position; but this defect admits of improvement. The property on each side of the way belongs, I believe, to the Crown: we know what the present Duke of Westminster has done with Belgravia, and there is, therefore, a hope that some day a Minister of Works will be found who will perfect Nash's work, and make his own name illustrious, by compelling the erection of worthier architecture, and the substitution of stone and granite for the compo and lath-and-plaster shams of the Regency. When this has been done, and when the Thames Embankment has been properly completed and planted, London, already the most varied and picturesque of capitals, will have little to fear in the way of comparison.

You must excuse this digression. I have made it, not only in justice to Nash, but because architects should have much to do in these days with Metropolitan improvements, and it is to be hoped they may be marked by the same breadth and boldness of plan shown by him. How much room there is for this, you may see for yourselves

if you pass from Regent-street and Portland-place to Victoria-street, Westminster, or the new street in Southwark to London Bridge.

I am not going to dwell on the other works of Nash, nor on those of Wyatt; they worked with imperfect knowledge, but they roused the spirit of inquiry in others, and paved the way for better things. The literature of Gothic art became studied, and Britton, Rickman, and the elder Pugin, with their followers, published many valuable works. A great religious revival was taking place at the same time, and the well-known Oxford movement led the clergy to throw their weight into the scale for the Gothic revival. Whereas it was at this time almost impossible to obtain skilled workmen for the subsidiary details of Gothic art, schools of carving, iron-work, stained glass, encaustic tiles, and the other kindred works of decoration sprang rapidly into being, this being due chiefly to the impetus given by the younger Pugin.

Sir Gilbert Scott has told you that, as the result of this movement, the Gothic revival holds absolute possession of the ecclesiastical architecture of the day, but that it has not yet obtained that mastery over secular buildings which was long enjoyed by its rival. Indeed, if we may judge by some recent preferences for what has been called the Queen Anne style, it may be doubted if it has not lost ground, rather than gained it, as regards this portion of the architects' work. We are therefore now again brought round to the problem with which we started, namely, what form is our art to assume in the future? We have seen that there have been two revivals, in some cases proceeding side by side with each other, and before we can answer the question we must ask, I think, what are the tendencies of our time, and what has being going on around us, while architects have been fighting the "battle of the styles?"

If architecture has not been idle, it is right to remember that the world at large has not been standing still, and we may therefore consider for a moment what have been the other characteristics of the last forty years. It cannot be doubted that they have been years of progress in the mechanical and engineering arts. I have before alluded to the rise and progress of what we call engineering; but the subject is so important as regards its bearing on architecture, that I must dwell upon it again for a few moments. Since Stephenson's development of the railway locomotive engine, in 1829, the increase of railways alone has been prodigious; indeed, some persons consider that they now constitute too large a monopoly to be left in the hands of private persons. We have nothing to do with such questions here; but, in order to show you the enormous progress that has been made in this department of engineering alone, I may mention that it has been estimated that if the railways were acquired by the State, their purchase-money would be little less than a thousand millions. These are large figures, and apply to railways only. While they have been in progress, millions upon millions have been spent upon steamers, docks, waterworks, and other enterprises of public utility. The Alps have been pierced, gigantic works of various kinds are in progress, or are being projected, and it would seem that the only limit of power which is now acknowledged by engineers is that of finance. Mankind has seen its various families brought more closely together, distances have almost been abolished, and instant communication secured with all portions of the world. The electric telegraph, from being regarded as a scientific toy, has become a mighty agency, whose full development cannot yet be accurately forecast. Would that it could be added, that the human race had experienced the full advantages of scientific knowledge, in the increase of happiness, caused by peace and prosperity! but it must be confessed that these signs of peaceful progress have been at least equalled by advances in the science of slaughter; and that, in spite of Christianity, and civilisation, men fight with men, as desperately as ever, and the horrors of war have perhaps never been so dreadfully exhibited in two worlds, as during the time under our review.

Many of the great achievements of science are of course removed altogether from the domain of fine art, though it has been a mistake to act too hastily on this supposition, in the case of some of them. The works of the engineer which have too often disfigured our towns, have generally a scale, and grandeur of conception, which in the hands of the true artist, might have made them things of beauty, as well as of use, and would have enabled us to regard them, if not with joy, at least with equanimity and content. Although, however, we have not at present reached this stage of feeling, no one can regard the mechanical triumphs of our day with indifference, and as Englishmen we cannot but be proud of the position taken by our own country in the van of the moment.

Whatever may be the final destiny of engineering, there can be no doubt that the duty of the architect must be to study the requirements of his time, and to reconcile utility with artistic beauty, in addition to making himself acquainted with the theory and practice of ancient art. It is the more necessary to urge this in consequence of the immense seductions of the antiquarian and archæological aspects of architectural study. Few things in modern history have been more remarkable than the revival of interest in these matters, and I should be sorry to be supposed to say one word for its discouragement. Only the student must not make it his all in all. Nothing can be better for him than to wander, sketch-book in hand, among our noble cathedrals, and historic remains, or to be found in quiet English villages, studying reverently the teaching of the sermons in stone of thousands of our churches; but if he go no farther than this, he must expect to find that architecture will come to be regarded by sensible men as an archæological curiosity, alien from the wants of the age, and unworthy of the attention of those who hold that the noblest object of man's study is Man. Something of this result is perhaps already to be seen, in the tone and temper of some public utterances on the subject of architecture, and it is well that the difficulties of the case should not be ignored by those who devote themselves to its study and practice. A heritage of carelessness and neglect has made the present generation, a generation of church restorers; and architects have therefore been especially called on to turn their attention in this direction. A strict conservatism has been naturally forced upon them by the course of events, and it may probably be maintained, without fear of contradiction, that at no time, and in no country, have so many difficult tasks of architectural restoration been successfully performed. There have of course been exceptions to this rule, and we have often to deplore a rage for so-called restoration, which has deprived some venerable fabric of every particle of historical value. But in all great movements there will be extravagances, and when the tale of our time can be written, it may probably be described, with considerable approach to accuracy, as an epoch of conservative art, and progressive science.

But is there any reason why architecture should rest content with mere conservatism, and abandon progress to the engineer and man of science? The Parthenon, the Hall of Karnak, and the Mediæval Cathedral, exhibit progress, not only in the artistic, but in the constructional or scientific sense, when contrasted with the Pyramids; and architects have now all the resources of the world at their command.

In speaking of engineering, reference has been made to the almost startling suddenness of its development, as we now see it. While an architect must too often feel that the structures of his time do not surpass, or even equal, the productions of his forefathers, an engineer is troubled by no such misgivings. It is doubtless too much to expect that architecture should rival the strides of engineering; but in its quality of a useful art, it is closely allied with science, and may expect to have some share in its progress. In the meantime it is impossible not to regard with feelings somewhat akin to jealousy, the well-grounded confidence of the modern engineer, that he can surpass the achievements of his fathers, and write his name on the history of his time.

While we pay an ungrudging tribute to the success which has attended engineering, we must nevertheless remember that it is not architecture. The one is a science, the other is art and science in combination. We may, however, reasonably inquire what are the principles which engineering has marked out for itself, and by which it consents to be judged. One of them is a careful adaptation of its works to the convenience of those who are to use them. This is a principle which should also be accepted by the architect. Again, engineering prescribes the use of fitting materials, and good statical forms, here also there is a common ground.

What, then, is the difference between architecture and engineering? It is, I think, principally a difference of addition.

The architect, no less than the engineer, must accept the dictates of common sense, but he must add to the work of the latter artistic beauty. The dull and heavy supports which a pure utilitarianism would give us, should become in the hands of the architect, replete with effects of light and shade, as they are adorned with mouldings and sculpture, or thrown into the form of columns and arches. The bare roof of necessary covering grows into domes, groining, or beauteous forms of woodwork, when it passes from engineering into architecture.

Our towns, instead of being planned with rectangular blocks, as in the chessboard-like arrangements of American cities, depressing in their dull monotony, may owe to the architect countless graces both of general and particular design. Churches, town-halls, and private dwellings may all charm the instinct for beauty, by reason of the architect's addition to that bare provision of necessity, which falls within the province of the engineer. With the latter, the materials employed must be used economically and scientifically, with strict reference to the utilitarian object in view. The architect must go beyond a bare sufficiency, and add the graces of ornamental construction, never forgetting that he is not to invent the ornament, for the sake of constructing it.

We have seen how great has been the progress of mechanical science. A similar activity has been shown in other branches of science, and every day we hear of some new and wonderful discovery,—now among the stars above us, now about the earth under our feet, the air we breathe, or the water we drink.

It seems to me unquestionable that architecture, to be a living art, must be in harmony with this state of things. It was reasonable, and perhaps necessary, that men should first turn their attention to restorations. This necessity has now passed away, and with it the day for copying the architecture of the past.

I cannot venture to predict the issue of the warfare of the styles, but with all the signs of the times before us, it is difficult to believe that future thought and science will be content to wear a Mediæval garb. The tendency of civilised nations appears to be in the opposite direction, and to demand that our architecture, on whatever foundations it may rest, should be consistent with the tendencies of modern ideas, founded on truthful principles, and not by its very completeness of imitation an elaborately constructed falsehood. At the same time it must be confessed that there is no such general agreement among architects on this point, as would justify me in directing you authoritatively, as to the selection you should make for your special studies.

The peculiarity of our position in these modern times prevents us from deriving much instruction on such a point from the experience of former ages. Up to the time of the revivals, each age possessed but one style of architecture, and followed it with singleness of aim. We have no reason to suppose that the old architects knew anything of the history of art, for they had no opportunities of learning it, unless, indeed, through the common craft of the mysterious body of Freemasons.

To-day we have to deal with a very different state of things. No one need be in ignorance of the history of architecture; and the art of engraving,—to say nothing of the process of photography,—brings home a knowledge of the forms and details of the architectural works of all ages and countries to all who wish to possess it.

Even in Wren's day, a visit to Rome was a formidable affair, and he never saw St. Peter's. To-day, you know how every one hurries on the wings of steam, to see everything that is worth seeing, in all parts of the world. The "grand tour," from being the crowning item of the patrician's education, has become the privilege of all who can command some weeks of leisure, with a few pounds to spare. Men hurry from point to point, and think they are studying art.

Modern restlessness may be either the cause, or the effect, of modern eclecticism, but in any case it would seem to be fatal to the acceptance of any universal rules of guidance in artistic matters. While, therefore, we cannot absolutely predict the future of architecture, we must devote our best efforts to work out the problem of reconciling beauty with utility, whatever may be the style of our individual predilection. If we think first of the purposes of our buildings,

and afterwards of the details to be used, we may probably find ourselves on the way to true originality, while we shall avoid the reproaches, so often levelled at architects, of not sympathising with their own time, in which they have been born.

Science must not be repelled, rather its alliance must be courted. If new constructions are required by convenience, they must not be grudgingly accepted. The use of iron is to the engineer as the air he breathes; it should not be neglected by the architect. Even now, many grand works of architecture owe to it their very existence; and in quite recent times, we have seen it applied as ties or struts to some of our most famous English cathedrals.

A scientific application of iron enables the architect of to-day to indulge in features more apparently daring, though not really so, than were possible in the days of our grandfathers. Are these opportunities to be rejected? It is rather the duty of the architect, as an artist, to study carefully the laws which limit the useful employment of iron in works of architecture, with a view to conform his designs to those laws, and so arrive at artistic successes, similar to those gained by our Mediæval predecessors, in their use of wood, stone, and the other materials with which they were familiar.

In the form of beams, iron offers obvious advantages to the architect, by extending his powers. He can, by its aid, venture on spans of floors, and roofs, hitherto only possible at vast expense, even if not altogether impracticable. It is only a few weeks since the President of the Institution of Civil Engineers informed the members that a bridge was about to be erected in Scotland, with openings 1,600 ft. wide, and piers 100 ft. in height above high-water mark. He also described a light-house which had been built in the midst of the sea, entirely of concrete. A short time previously one of the first engineers of the day had pledged his reputation to the feasibility of connecting England and the Continent by a tunnel under the Straits of Dover. I cannot but think that architects would do well to consider carefully these signs of the times, and to accept readily the conclusions to be drawn from them.

In questions of construction they may learn much from the engineer, and may often work hand in hand with him to the public advantage. Bridges and aqueducts were once considered to be within the province of the architect; but we may be sure that when such gigantic dimensions, as I have mentioned, can be promised by others, there will be little disposition on the part of the public to revert to the more timid constructions of past ages, even if to an artist's eyes they may appear more beautiful. This being so, is it not our duty to make the best of the circumstances in which we are placed? No one is bound to attempt impossibilities, and the revival of Greek temples and Mediæval cathedrals must, I think, be reckoned among them. The form may be copied, but the spirit is not there. You may obtain clever reproductions, delighting the scholar, and the antiquary, but you will feel your hold on public taste slipping away from you, until a dreary and hideous utilitarianism shall reign supreme.

I cannot do more now than commend these points to your consideration, in the hope that you will think them out for themselves, and come to a sound decision upon them. If I have not ventured to pronounce dogmatically on the prospects of architecture, I have, nevertheless, attempted to indicate the principles which seem to me likely to govern in the future the practice of our art. The particular application of them must be left to the taste and genius of architects.

To some, it will appear that the true path is from a Mediæval starting-point, and that we should ignore all that has been done before or since the thirteenth or fourteenth century, and start afresh. Others will hold a reference to classic traditions the more reasonable course. By another school it will be thought impossible to close our eyes to the experience of past ages, which is laid before us, as in an open book, and to ignore what has been done by either of the rival systems of architecture. These will inquire whether there may not be some common principles of beauty inherent in both systems, on which future excellence may be based, without a rigid adherence to conventional rules of style. They will further insist that architecture must be governed by common sense, and be consistent with modern ideas. Their preferences may lead them, in the first instance, to that Anglo-Italian type of which I have before spoken, with such modifications and extensions as circumstances may require.

This style possesses the convenience of round arches, and square lintels, and will admit of various degrees of treatment. Heroic, or domestic, according to the necessities of the case, it can display stateliness when required for public purposes, and plasticity when the demands upon it are more humble. It will readily combine with the sister arts, and is prepared to accept new materials or new processes. It seems, therefore, to offer a meeting-ground on which something like a fusion may be effected. The adoption of what is called the Queen Anne style, little as some of us may approve of it abstractedly, would appear to be an effort to follow out this principle. As far as we can define this manner of work, it may be termed an attempt to unite the picturesqueness of the Gothic with details, not very pure, belonging to Classic architecture,—a Renaissance, in fact, but less strict and refined than the style to which the term is usually applied.

To those who are attracted by it, I would recommend the study of the châteaux on the Loire and in the centre of France. They will find in them all that the Queen Anne style gives them, and I think much more. To great boldness and variety of outline, these Renaissance buildings add an elegance of ornament which is based in some examples on Mediæval, and in others on Classic precedents, according to the dates of their erection. They are exceedingly rich in picturesque details, such as high roofs, turrets, chimney shafts, and dormer windows, and they adopt windows of various sizes and shapes, mullioned or otherwise, according to circumstances. The convenience of round arches and horizontal floor divisions is freely accepted, and the great roofs, which are invariable, offer facilities for the provision of a number of secondary bedrooms, to do which, without either meanness, on the one hand, or extravagance on the other, is not one of the least difficulties of an English architect engaged on domestic work.

Those of you who have not yet visited the valley of the Loire, will find it a most delightful architectural excursion, starting from Orleans, by Blois, Tours, and Angers, to Nantes, with excursions, from time to time, on the right, and left banks of the river. At Blois, and Amboise the details have a Mediæval character, while at Chenonceaux and Chambord, they are for the most part based on Classic forms, and in some cases, such as the applied Corinthian pilasters, they are copied from Classic precedents. These fine old structures appear to me to be full of suggestions to ourselves; but in any case I know of nothing more interesting than the evidence they afford, of the taste and tendencies of their builders, in a transitional age, anxious to adopt the new forms of the day, while still clinging to the traditions of the past.

The time warns me to conclude. In these two preliminary lectures, I have but touched lightly on the considerations which must affect the future of architecture, but I would wish to convince its students of the greatness of their mission.

In following architecture, they are the slaves of no mean mistress; and if they wish for success, they will need all their best energies to obtain it. Their devotion will be excited and controlled by the responsibilities cast upon them by the peculiar characteristics of practical architecture. Simplicity and truthfulness will be their aim in their studios, as in their homes, together with untiring industry. Without the latter they will scarcely thrive, for to the architectural artist, in an especial degree, there is no royal road to excellence.

This lecture has been meant as an incentive only to private study, and I shall be glad if any who hear me have had awakened in them a conviction that, great as have been her past triumphs, architecture may have yet before her a glorious future.

Painting and sculpture can hardly look for progress, because, being pure fine arts, there is no room for their advancement, by reason of any increase in the powers of man. Phidias or Titian may possibly be rivalled, but they cannot be surpassed. What Man can do now, as a painter or sculptor, he could always do, and no advance of knowledge can increase his artistic capacity. With architecture, as a mixed art and science, it is different; and as she is bound to recognise utility, she is of necessity connected with scientific progress, and may, therefore, be destined to surpass in the future the achievements of the past.

To ensure progress, it is indispensable to be first certain that we are on the right path. "Be sure you're right, and then go ahead," is advice which none need be ashamed to follow.

To advance art is a noble mission, and never more so than now, in an age of fastidious civilisation, of wealth, luxury, and softness. It is surely something to have aims and aspirations independent of that money for which men lie, and steal, and murder, and to aspire to a fame not to be measured by its glittering standards.

A conscientious artist will meet with much to discourage and disappoint him, but his pleasures will be pure. He will live in a world of his own, and happy will he be, if, when the night cometh, he can repose, as does our great English architect at St. Paul's, under the well-earned epitaph—

"Si monumentum requiris circumspice."

ARCHITECTURAL STUDENTS.*

As the greater number of our members are pupils or students of architecture, it strikes me that a few words of advice as to the course of study to be pursued, to fit them for the practice of our profession, may not be out of place. I do not propose to give many or any hints on professional practice or office routine, but to confine myself to the preliminary preparation for embarking in practice.

In almost all other professions the student undergoes a systematic preparation for the calling which he has chosen, by going through a regular course of studies, attending lectures, and passing certain examinations to prove his proficiency before being admitted to practice. Now, the contrary obtains with architecture; no tests being required as to ability, any man may put a brass-plate on his door inscribed with the magic word, and forthwith he becomes an architect, the consequence being that several builders, auctioneers, land agents, and others include the practice of the profession of which we are members in their lists of accomplishments; the result being, that gentlemen and journalists look down upon us, and the Government of the country stoops from its lofty position to heap humiliation and insult on our devoted heads, one of the English journals—"a journal written by gentlemen for gentlemen"—going so far as to make in all seriousness the bloodthirsty suggestion, that to hang a few architects would be a salutary example and a fitting protest on the part of the public against the sanitary and other defects of the suburban villa of the present day, for the construction of 90 per cent. of which, it must be borne in mind, architects are in no-wise responsible.

How is this state of things to be remedied? How are the public to distinguish between the genuine architect and the impostor? I say that the remedy lies in our own hands. Let us raise the status of our profession; let us educate the future architect, and rigidly set our face against and exclude from all intercourse with us those who, by irregular or unprofessional conduct, tend to lower us in public opinion. But the surest way is to guide the young aspirant in his studies, and endeavour to instruct him in all things he should know, in order that—as is too often the case—he may not be but beginning his studies when they should have been well nigh ended, and when he should be in a position to drop into the ranks of those who are working at architecture as a means of livelihood. Let none of us be so blinded by selfishness as to refuse to impart information to any requiring it; but let us give it cheerfully, bearing in mind how we should ourselves have felt such a refusal, and that by instructing young men we are but bettering our own prospects and those of the profession at large, for the more learned and clever our body is, the more it will be respected and looked up to by the public.

The late Mr. Dickens, in one of his novels—with which, I suppose, you are all familiar—has painted to the life (and as only an observer of human nature like himself could have done) the disadvantages and absurdity of the pupil system. Let none of us say that Pecksniff is an overdrawn or extravagant picture, for we know in our hearts it is not so, for Pecksniff still lives and flourishes amongst us.

Although the faults of the present system of pupilage are, I dare say, patent to all here, yet I may be permitted to briefly enumerate them

* By Mr. J. L. Robinson. From a paper read at a meeting of the Architectural Association of Ireland, February 28th.

before proposing a remedy for them. We will take as an example a case with which we are all familiar: Tom, the clever boy, when at school shows a decided taste for drawing, and his sketches having been duly touched up or completely re-drawn by his master, are at vacation time brought home and exhibited by his fond parents to friends and relations with the same amount of pride as if they were rare impressions of Albert Dürer or The Carraccii. It is agreed by all that he is a very clever boy indeed, and has a decided taste for drawing. He goes on with his usual school course—plenty of classics and little or no science,—and accumulates more and more pencil sketches. At sixteen he completes his studies, and is, after some preliminary bargaining between his father and Mr. Blank, F.R.I., &c., as to the amount of fee and length of servitude, duly installed in the office of the aforesaid Mr. B., the eminent architect,—it being ten chances to one that up to that day Tom has not had the slightest notion of what an architect is, and is struck with astonishment at the large drawing-boards, squares, and other paraphernalia that meet his eyes. Mr. B. pats him on the head in a fatherly and affectionate manner, and says he is a very clever boy indeed; that his sketches are most beautiful, and evince a great deal of talent; that he will make him an architect in no time, together with other compliments highly flattering to our friend Tom's juvenile mind. He is ushered into the office, and finds he has for his companions two assistants and four or five pupils—the latter in various stages of being ground into architects in this first-class manufactory of the genuine article, where architects are turned out in the shortest time, and on the most moderate terms. Some are in a rough state, and others are almost quite polished and finished off—which means that they have spent nearly four years tracing plans for Mr. B., and occasionally varying that interesting occupation by holding the tape for one of the assistants when out measuring land or buildings. Tom has a board, squares, instruments, and paper placed before him, and is initiated by one of his companions in all the mysteries connected with compasses, Indian ink, rubber, drawing-pens, &c. After perhaps a month's preliminary training he gets his first tracing to make, and it is very probable that his attempt is a very poor one indeed; yet he improves after a time, and gets all that description of work; the other young gentlemen having his instruction in their hands, give him any job that may be distasteful to them, and set themselves out to teach him as little as possible outside the office work. So the four years pass over, Tom occasionally getting details to ink-in and drawings to clean up or copy, and varies the routine of office work by taking three, or perhaps four, months' shooting each year, with cricket matches and other amusements on an average of say twice a-week during the remaining eight months. The four years have expired, and he is handed over his indentures by Mr. B., who, if he has a large practice, may send him as clerk of works for a few months to some of his buildings, just to give him a start; or Tom, thinking his studies are over, if he has sufficient connexion or influence, takes an office, and comes forth into the world as a full-fledged architect.

Now, let us ask ourselves what has he acquired during his four years' servitude? It is probable that during the whole of that time he has not received one word of instruction from the man who has been paid to teach him his business, nor seen a specification, such documents being prepared by an assistant, or—a still worse practice—by a building surveyor outside the office altogether. He does not know how to make a perspective drawing, and it is likely cannot design the simplest thing without a wholesale raid on architectural works and the building journals; and it is almost certain that he has never seen an architect's certificate during the whole time; and as for construction, you might as well expect to find a knowledge of astronomy in a South Sea islander.

Although the inherent defects of the apprenticeship system are many and great, yet if our friend had been a studious boy, and paid attention to his studies, and taken some interest in learning his business, he would not be a by-word and a reproach to the profession, and a laughing-stock for builders and practical men, who cannot understand his plans, and fear to construct his roofs as shown on his drawings for a wholesome dread that they would certainly fit some of their workmen for a coroner's inquest. He would lose no opportunity of learning something, and would not copy a constructive drawing without asking himself the why and the wherefore of its different parts; he would learn Tredgold's and other works on carpentry, and carefully study Nicholson and our old friend Sir W. Chambers; he would get a specification occasionally, and copy it out, and in fact endeavour by all means in his power to obtain as much information as possible bearing on the profession which he has chosen. If he does this and fails, he will at least not have himself to blame for his non-success.

Let me impress on any of you who are pupils that now is the time to gain information, for any knowledge that will be acquired after you have commenced to practise will have been dearly bought, perhaps at the price of humiliation and disgrace, through some failure in your work that might have been avoided if during the golden hours of youth you had not wasted your time, and allowed the precious moments to pass by in idleness and indifference. It is not sufficient that you should pass through your four years' apprenticeship by just going through the routine of office work from 10 a.m. till 4 p.m. No time should be lost in idleness; you should bring home your master's books to read, and draw at home after hours. You should learn the principles of carpentry, and the uses of the different building materials, how to write a specification, to take out quantities, to measure up extras, check builders' accounts, and make valuations,—all which important matters are to be learned by keeping your eyes open, and observing the manner in which your master conducts his business, and by reading books bearing on those subjects. You should also learn to draw well and neatly both in pencil and ink, and, if you have the taste, in colours, and to make sketches from existing examples. You should learn projection, shadows, and, most of all, perspective; for none can be architects that have not an intimate knowledge of the principles and practice of perspective, or the appearance their designs will assume in execution.

THE BELLS AND CARILLON MACHINE, WORCESTER CATHEDRAL.

So much interest has been recently expressed concerning the bells and bell-chiming arrangements in Worcester Cathedral, that we are led to give a view and plan of the bells and bell-chamber, together with a view of the carillon machine recently completed there. The proposal to raise funds by subscription, to provide the cathedral with a clock and peal of bells, was originated by the Rev. Richard Cattley, minor canon of Worcester, and by his perseverance and devotedness to the object it has been successfully carried out. In his appeal Mr. Cattley said, "I have felt anxious for some time past that the noble tower of our cathedral, which rears itself with so much grandeur, not only over the city but also over the rich valley of the Severn that environs it, should, with the sanction of the Dean and Chapter, be furnished with a clock, in which all the resources of modern art (including, if practicable, daily telegraphic communication with Greenwich Observatory), together with the most finished workmanship, should be combined. And not only so; but, in order to complete a scheme worthy of Worcester, which from its rising importance now takes no mean place amongst the cities of England, I propose that we provide a peal of twelve bells, in the key of D flat, on the heavier of which the noted Westminster quarter-chimes would be sounded; and a bell of great power and magnitude, much after the model of the Leeds Town-hall bell, the note of which would be B flat, weighing nearly 5 tons, on which to strike the hours. The carrying out of this latter part of my plan is the hinge on which the whole practical utility of the scheme would turn, because by such a grand measure only would the time be distinctly indicated in every part; thus all other clocks could be regulated with perfect truthfulness; and I also make bold to say, without fear of contradiction, that the changes at the quarters, corresponding with the celebrated chimes to which I have just alluded, and answering to the deep-toned hour-bell, will present a combination which has not as yet been equalled, and will, moreover, only be surpassed when the unfortunate 'Big Ben' passes successfully through the founder's hands."

The sum named at first as the probable cost was about 4,000*l*. The greater part of the money was speedily raised, and the work was put in hand.

The casting of the bells was successfully completed by Messrs. John Taylor & Co., of Loughborough, and the tone is pronounced exceedingly fine.

The ringing peal consists of twelve, the weight of the tenor being 50 cwt.; note D flat. They are dedicated to the Twelve Apostles, and the name of the Apostolic Patron is cast in beautiful 15th-century letters on the waist of each bell. The Cambridge Quarter Clock Chimes necessitate an extra bell sounding D natural. This is dedicated to St. Paul.

The weight of each bell, with the title and note, is as follows:—

No.			cwt.	qrs.	lb.
1.	S. Matthias	A flat	6	3	19
2.	S. Judas Jacobi.....	G flat	7	0	22
3.	S. Simon Zelotes ...	F	7	2	10
4.	S. Jacobus Alphæi...	E flat	8	3	0
5.	S. Matthæus	D flat	10	1	21
6.	S. Bartholomæus ...	C	11	0	24
7.	S. Thomas	B flat	12	0	0
8.	S. Philippus	A flat	15	2	11
9.	S. Andreas.....	G flat	21	2	11
10.	S. Joannes	F	26	1	8
11.	S. Jacobus	E flat	34	2	12
12.	S. Petrus	D flat	50	0	0
Extra Quarter Bell S. Paulus		D	9	2	4
Total.....			221	3	12

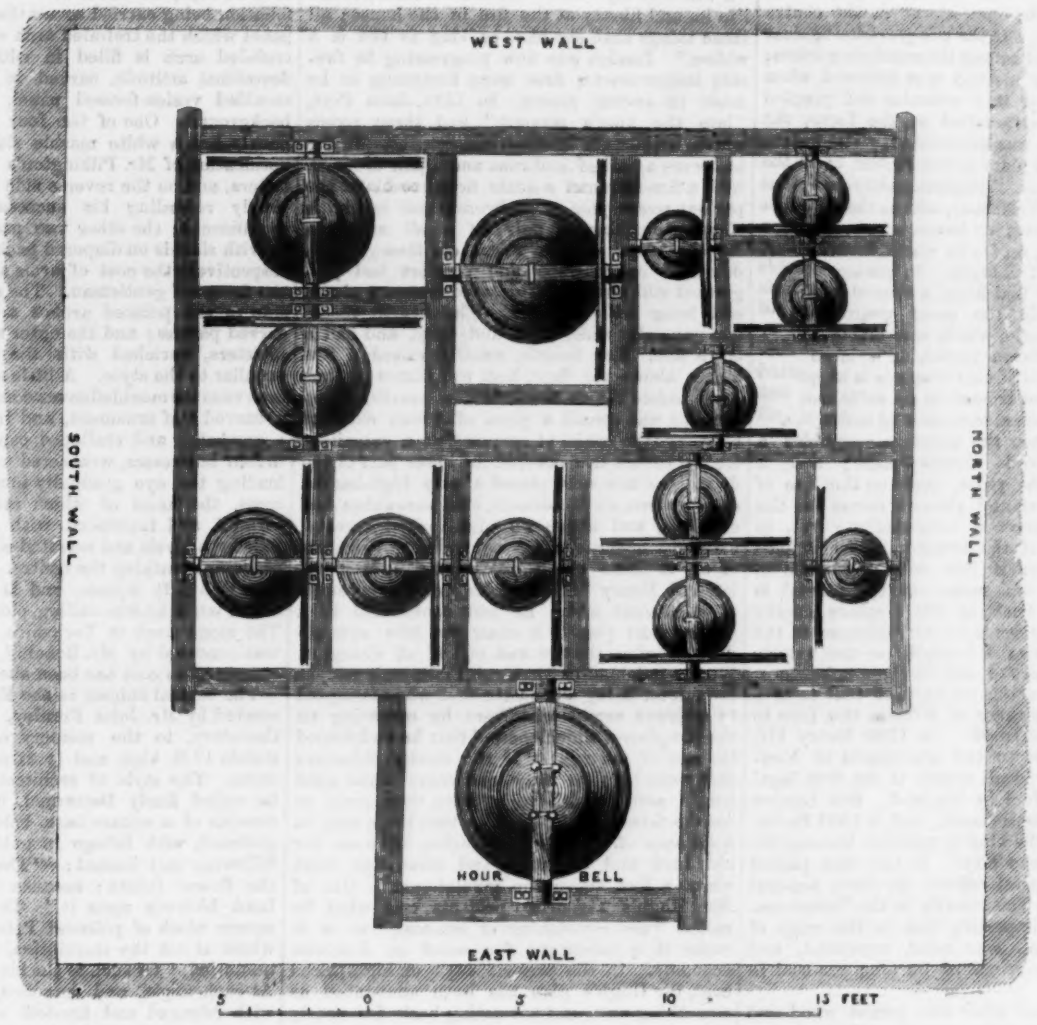
There is also the great bell, on which the hours will be sounded by a new and powerful clock, constructed by Messrs. Joyce, of Whitchurch, Salop (from the designs of Mr. E. B. Denison, Q.C.), weighing 4 tons, 10 cwt.; making a total weight of metal of 15 tons, 11 cwt., 3 qrs., 22 lb. This bell is a fine casting, and the note B flat is a remarkably true and full one. The ornamentation is of the same character as the peal bells. There are also four coats of arms on the waist—(1) England; (2) See of Worcester; (3) Dean and Chapter of Worcester; (4) City of Worcester. Round the crown is a text of Scripture, Eph. v. 14—"Surge qui dormis et exurge a mortuis, et illuminabit te Christus." (See Durandus de Campanis.) Also, on the lower part of the bell, in addition to the founder's name, is the following:—"*In usum Ecclesiæ Cathedralis Christi et beatæ Mariæ Virginis in Civitate et Comitatu Vigorniensi. Anno Domini MDCCCLXVIII.*"

The following is the estimated expenditure:—

Bells, oak frame, and all necessary fittings complete	£2,677
Clock, about	500
Timber trussing, floors, &c., about...	1,200
Architect's commission, about	70
Gas-fittings	12
Chiming apparatus (Ellacombe's) ...	20
Wire for tower windows, about	35
Incidental expenses, including taking down old bells, printing, advertising, &c., about	200
	£4,714

The large bell was tolled for service for the first time by Mr. Denison and the Rev. H. T. Ellacombe, on Sunday, the 17th of January, 1869, in the company of Mr. Cattley and others.

A desire having been expressed for the restoration of the ancient musical chimes, which had fallen into decay many years ago, Messrs. Gillett & Bland, of Whitehorse-road, Croydon, who have brought the machinery for such chimes to great perfection, were called in, and have constructed a machine on a new and patented principle, a great improvement upon the original patent which was first applied to a set of Belgian bells in Boston Church. Since then the firm have effected many improvements, all of which have been introduced in the piece of mechanism under notice. It may be well to state that the chimes are the quarter-chimes of the clock. Mr. Ellacombe's chiming-hammers strike the bells inside with round hammers pulled by ropes, so that the success of the tunes or chimes depends entirely upon the skill of the performer; but the carillon machine is an automatic musician, the tunes being played entirely by machinery, and let off by the clock at the proper times. The carillon machine is constructed to play twenty-eight tunes on fifteen bells, but at present it will play seven tunes only on the ringing peal of twelve bells, occasionally introducing the great bell of 4½ tons, which has a grand effect. The tunes are original, composed for the purpose. This we are disposed to regard as a mistake.



Plan of the Bells and Bell Chamber, Worcester Cathedral.

Known tunes would have given more general satisfaction. When two extra bells are provided (which are essential in order to render the music of the Worcester carillons the finest in England), the other three barrels will be pricked with seven tunes on each. There are thirty-four keys to the machine, only twenty-four of which are now used. The machine is wound up every morning, and plays eight times in the course of twenty-four hours, a period of three hours elapsing between each performance. The same tune is repeated three times on each occasion, and it continues in action four minutes and a half. At the expiration of twenty-four hours the tune changes involuntarily, and in like manner the seven tunes of the barrel are consecutively played. Its connexion with the clock is by means of a lever, which, by a mechanical arrangement, is gently drawn when the time approaches, dislodging a pin, and thus setting the machine in motion. The motive power is obtained by weights, and the speed, as in clocks, is regulated by revolving vanes, capable of easy and instantaneous adjustment. The barrel, which is exactly on the same principle as that of a musical box, and is constructed to play seven tunes, is studded with brass pins, and in its revolution releases the detents and lets the hammer descend upon the bell; a cam-wheel of peculiar construction, continuously revolving, immediately draws the hammer back into a striking position, and forces the detents back into their proper place. When the bells are required for ringing, by a simple arrangement a bar is turned down on the keys, which prevents the machine being set in motion, so that the ringing may continue for any length of time without fear of interruption. The works of the machine are enclosed in a massive cast-iron frame, bolted together with iron nuts and bolts, and 7 ft. long, 4 ft. wide, and 4 ft. high, and weighing over 1¼ ton. The motive power is given by weights, weighing 14 cwt., which are suspended by a steel line (280 ft. in length) from the iron barrel which drives the main wheel, and thus sets the whole machine in motion. The four musical barrels have seven tunes on each, and are 5 ft. long, 12 in. in diameter, and are made of mahogany, each being pricked with 1,100 brass pins, one-eighth of an inch square. There are twenty-six hammers for striking the bells, some of which weigh 2 cwt., 1¼ cwt., and 70 lb. each, altogether weighing 1,202 lb. The weight of the whole machine, including hammers, cranks, lines, &c., is nearly 4 tons of metal.

The great advantages claimed for the new system of carillon machinery are, that instead of the hammers being lifted up by the pins on the musical barrel (in the way common to all chiming machines on the old system), the two actions of lifting the hammers and letting them off to strike the bells are separated, so that the moment the hammers are released by the small pins on the musical barrel, they are again instantly raised into the striking position, their actions being perfectly simultaneous.

To show the facility with which the carillon machine acts upon the bells, it is stated that, notwithstanding the great weight of the hammers, an ivory key-board could be attached, the same as in a pianoforte, so that the tunes could be played upon the bells by the fingers as easily as playing a church organ, and any number of tunes could be played by having a series of musical barrels with seven tunes on each.

Disputes have arisen as to the authorship of certain improvements made in the carillon machine, and which may result in litigation We will not attempt to apportion the merit due to this or that person, but it seems clear to us, after some examination, that to Messrs. Gillett & Bland belongs the credit of having brought the machine to the condition in which we find it in Worcester Cathedral.

For the addition of the chimes to that cathedral the citizens of Worcester are indebted to the munificence of Mr. J. Wheeley Lea. The Rev. R. Cattley is to be heartily congratulated on the success which has attended his efforts to furnish the cathedral with a magnificent peal of bells, and to develop their excellence to the fullest possible extent.

FIRESIDE LORE.

THE paper on "Some of the Sanitary Aspects of House Construction," recently quoted in the *Builder*, furnishes a text for a gossip concerning fireside matters in the olden days. Going back to the grim gray dawn of history, we come to a time when fire was unknown. The oldest tradition relative to its discovery is that a Phœnician hunter observed a conflagration that had been excited in a forest by the attrition of some trees during a storm. To come down to later times: when Magellan visited the Marian Islands in 1521, the natives considered themselves to be the sole inhabitants of the world. They possessed none of what are termed the necessaries of life, and were in total ignorance of fire. Several of their huts being consumed during a thunderstorm, they considered the flame to be a kind of animal that attached itself to the wood and fed upon it. Martini, in his History of China, states that one of its earliest kings, following the inspiration of Heaven, first taught his countrymen the art of producing flame by rubbing pieces of wood together; then, says another Chinese historian, from being slaves of earth like the barbarians, the children of the Celestial Empire became the eyes of the world, for they alone could produce fire and convey it to places where it was wanted. But for this contrivance, a great portion of the globe must have remained a desert. Neither will our admiration of the discovery be diminished on finding that for many thousand years no improvement was made on the simple method by which the inventors first warmed themselves

and their neighbours. A fire of dried wood or grass, built up in the open air or in the centre of the cave or tent, was the one provision against chilly weather used among the wandering tribes; and the same rude method was followed when man had gathered into societies and peopled cities. As the years rolled on, the focus, the hearth, of a home was established. The hearth occupied the same place in the British as in the Anglo-Saxon houses. Giraldus Cambrensis, that most patriotic of Welshmen, tells us that families inhabit a large hut, or house, which, having a fire in the midst, serves to warm them by day, and to sleep round at night. In the strongholds of the time of the Red King, a central hearth is seldom found. In the great guard-room of Connisborough Castle, which was erected in or near the Anglo-Saxon period, is a large fire-hearth. The mantel of this fireplace is supported by a wide arch, not trusted to as sufficient, but having two transom stones running under it, and at a little distance the aperture resembles a modern ornamented chimney-piece; and a ground-plan of the room, made on the line of the soffit of the mantel, shows a recess for the hearth on the common construction; yet, in reality, the back of the fireplace, where it joins the hearth, is on a line with the walls of the room, and the recess at the mantel is formed by the back of the fireplace sloping outwards, as it rises into the thickness of the wall until it reaches a loophole on the outside that forms the place of exit for the smoke.

The first legal notice we have of coal is in a grant made in the reign of William the Lion to the monks of Holyrood. In 1239 Henry III. granted a charter to the inhabitants of Newcastle to dig for coal, which is the first legal mention of that fuel in England. But London objected to Newcastle coals, and in 1306 Parliament petitioned the king to prohibit burning the noxious fuel in the city. A law was passed making it a capital offence to burn sea-coal within the city. The records in the Tower contain a document importing that in the reign of Edward I. a man was tried, convicted, and executed for the crime of burning sea-coal in London.

Long before and after this period wood and peat were the fuel of the country. The prejudice against coal was exhibited even in the coal-fields. In 1349, at the religious house at Whalley, peat with a very little wood was the only fuel used, although coal abounded in the neighbourhood. In this same house wood was generally used for light, as there was but a scanty provision of oil for lamps, and of tallow almost none; indeed, tallow candles did not take the place of splinters and flambeaux till the close of the thirteenth century. In those days there was no fireside comfort, even in the houses of the nobles. The spacious, lofty hall, left open to the roof, had its windows placed high from the floor, and filled with oiled linen or painted glass. The doors opened by latches, and when the walls were not coarsely painted in the fashion of the time they were left rough and covered with arras, suspended by hooks at a distance of three to four inches from the wall. The floor of stone or earth had a portion at one end raised above the general level and laid with planks. On this dais stood a cumbrous table and benches, and a high-backed seat for the master, under a canopy. On the hearth in the centre of the hall were placed the andirons for supporting the ends of the brands that were arranged by means of a heavy double-pronged fork, the predecessor of the modern poker. The cottages of this time were little better than pig-sties. Beds they had none; the inmates curled themselves up to sleep as best they could round the fire of turf that burned on the floor of clay. The fifteenth century saw many fireside improvements. In the inventory of Sir John Falstaff's effects we read, in regard to the furniture of one room:—"Item, 1 andiron; item, 1 fire-pan; item, 1 pair of tongs"; and in the same document, "Item, 1 pair of bellows in the lady's chamber." In this same century Ennius Sylvius relates that he saw the poor people in Scotland, who begged at the church-doors, receive for alms pieces of stone, with which they went away contented. "This species of stone, with whatever inflammable substance it may be impregnated, they burn in place of wood, of which their country is destitute." Though coals and wood were not high priced in England, firing was in general scarce, and in country places the hearths were few, and therefore of such importance that the right to use them was sometimes bequeathed. In 1516 Richard Byrchette, of Pesemershe, testifies:—"I will that my wife shall have the chamber she lies in, and liberty at the fire in the house; all these things shall she have as long as she is a widow." London was now progressing in fire-side improvement, fires were beginning to be made in several rooms. In 1524, John Port, "late the king's servant," had three rooms which, besides the kitchen, had hearths. In the hall were a pair of andirons and a pair of tongs, with a fire-rake and a little fire-shovel; in the parlour was a pair of andirons; and in Port's sleeping-chamber, a pair of small andirons. At the close of the reign of Henry VIII. domestic convenience and comfort had progressed still further. The windows were glazed and hung with curtains. The hearth recess was generally wide, high, and deep, and had a large flue. The hearth, usually raised a few inches above the floor, had sometimes a dais made before it. In front of the hearth, or on the dais was spread a piece of green cloth or tapestry (the initial of carpets), as a substitute for the rushes that covered the lower part of the floor. On this were placed a very high-backed chair or two, and footstools, that sometimes had cushions, and above all high-backed screens, excellent inventions for neutralising draughts of air in these chilly apartments. It is related of Henry VIII., that he gave the revenues of a convent which he had confiscated to a person who placed a chair for him commodiously before the fire and out of all draughts. We are indebted to Sir Hugh Platt, an ingenious lawyer, for being among the first who attempted to improve smoky chambers by operating on the fire-places, which showed that he understood the seat of the evil. "If the smoky chimneys that want help be large, and carry some good length and breadth with them, then erect or build a false back or sides, so that there may be a distance of three or four inches between the old back and the new, and raise this work about a foot above the mantel-tree." One of Sir Hugh's favourite projects was what he called "the sweetening of sea-coal," so as to make it a substitute for wood in domestic economy. In the present days of high-priced coal, Sir Hugh's plan has been announced as something new, and not dating back for nearly three hundred years. In one of his books entitled "A New Cheape and Delicate Fire of Cole-balls," he says, "In the winter season, after a few frosts, as much loam is to be gathered as is necessary; half a peck of it is to be dissolved in a tub of water, and mixed into a very fine pap. A bushel of the best sea-coal is to be strewed upon a paved floor and bruised with a hammer or by treading under foot. The coals are then to be spread, some handfuls thick, upon the floor, and some of the thin loam pap sprinkled evenly over them." When the loam and coal are thoroughly mingled, the mixture is to be rolled into balls. This recipe was no invention of Platt's, for he says, "when these balls are thoroughly dried they are ready for use, after the manner of Lukeland in Germanie, which form of firing hath been with them many years past."

RECENT CEMETERY MONUMENTS.

OUR engraving illustrates three typical modern cemetery monuments recently erected from the designs of Messrs. Horton and Bridgford, of Manchester. The first structure, on the left-hand side of engraving, is known as the Pilkington Monument, and has been set up to the memory of the late Mr. George Pilkington by his trustees and relatives, in the churchyard of All Saints', Oxford-road, Manchester. It is about 4 ft. square and 17 ft. high, with four sides similar in design. The monument may be described as an arched canopy, having, in place of a statue, four memorial tablets, one in the panel of each arch. There are five stages: the lowest includes slab and base; the next, the pilasters of the canopy, shafts, and the tablets; the third, the arches of the canopy and those surmounting the tablets; the fourth, the sloping roof; and the highest is a cross. The style of architecture is Early English. The angle pilasters have carved capitals and moulded bases. From these capitals springs, on each side, a pointed arch with boldly-cut arch mouldings, and label moulding terminated with foliated bosses; and immediately under this arch is a trefoiled arch, with carved spandrels and arch mouldings, enriched with polished green and red serpentine marble panels, and carried on green and red serpentine marble columns, with foliated caps, and bases as before described, the foliation being carried across the central recessed panel which the trefoiled arch surmounts. The trefoiled arch is filled in with an angel in a devotional attitude, carved in high relief in a moulded vesica-formed panel, on a diapered background. One of the four central recessed panels has a white marble slab let in, with a notification of Mr. Pilkington's death, in Gothic letters, and on the reverse side is a similar slab, briefly recording his successful career and munificence; the other two panels being filled in with shields on diapered backgrounds, bearing respectively the coat of arms and the initials of the deceased gentleman. The spandrels on each side of the pointed arches are relieved with carved pateræ; and the outer angles, above the pilasters, enriched with the tooth ornament peculiar to the style. A little above the pointed arch runs the moulded eaves-course, enriched with a carved leaf ornament, and from which slopes a crocketed and scalloped canopy, terminating in four buttresses, weathered on all sides, and so leading the eye gradually to a simple, effective cross, the arms of which are foliated at the termini, and interlaced with a circle with trefoiled spandrels and serrated edges, a carved leaf ornament marking the centre. The whole stands on a slab 8 ft. square, and is surrounded by a dwarf wrought-iron railing, picked out in colours. The stone used is Yorkshire. The monument was executed by Mr. Bonehill, of Upper Brook-street. The cost has been about 160*l*.

The central subject is the Fernley Monument, erected by Mr. John Fernley, in the Southport Cemetery, to the memory of his infant son, stands 17 ft. high, and is executed in Portland stone. The style of architecture adopted may be called Early Decorated, freely treated. It consists of a square base, boldly weathered and gableted, with foliage in gablets, and has the following text incised:—"The grass withereth, the flower fadeth: because the Spirit of the Lord bloweth upon it." The base carries a square block of polished Peterhead granite, on which is cut the inscription, finishing with the quotation, "Of such is the kingdom of Heaven." At each angle, and detached, stands a pilaster with engaged and banded marble column, in recess on each of the inner angles, all having foliated capitals, carrying the arch moulding, enriched with fern-leaf, the inner order of which has cuspings, with foliated terminations, and carved spandrels from the inside of the moulded ribs, with carved corbels at their intersections, forming a groined roof over the granite block. Above the arch mouldings, on each side, is formed a crocketed canopy, the hood moulding being enriched with foliage. In the centre of each canopy is carved an angel's head, the spandrels around the same being filled in with foliage, and terminated at the top with figures emblematical of Faith, Hope, Charity, and Religion. The whole is surmounted with a crocket spiret, finished with a carved cross, and on the four angles at its base are angels seated.

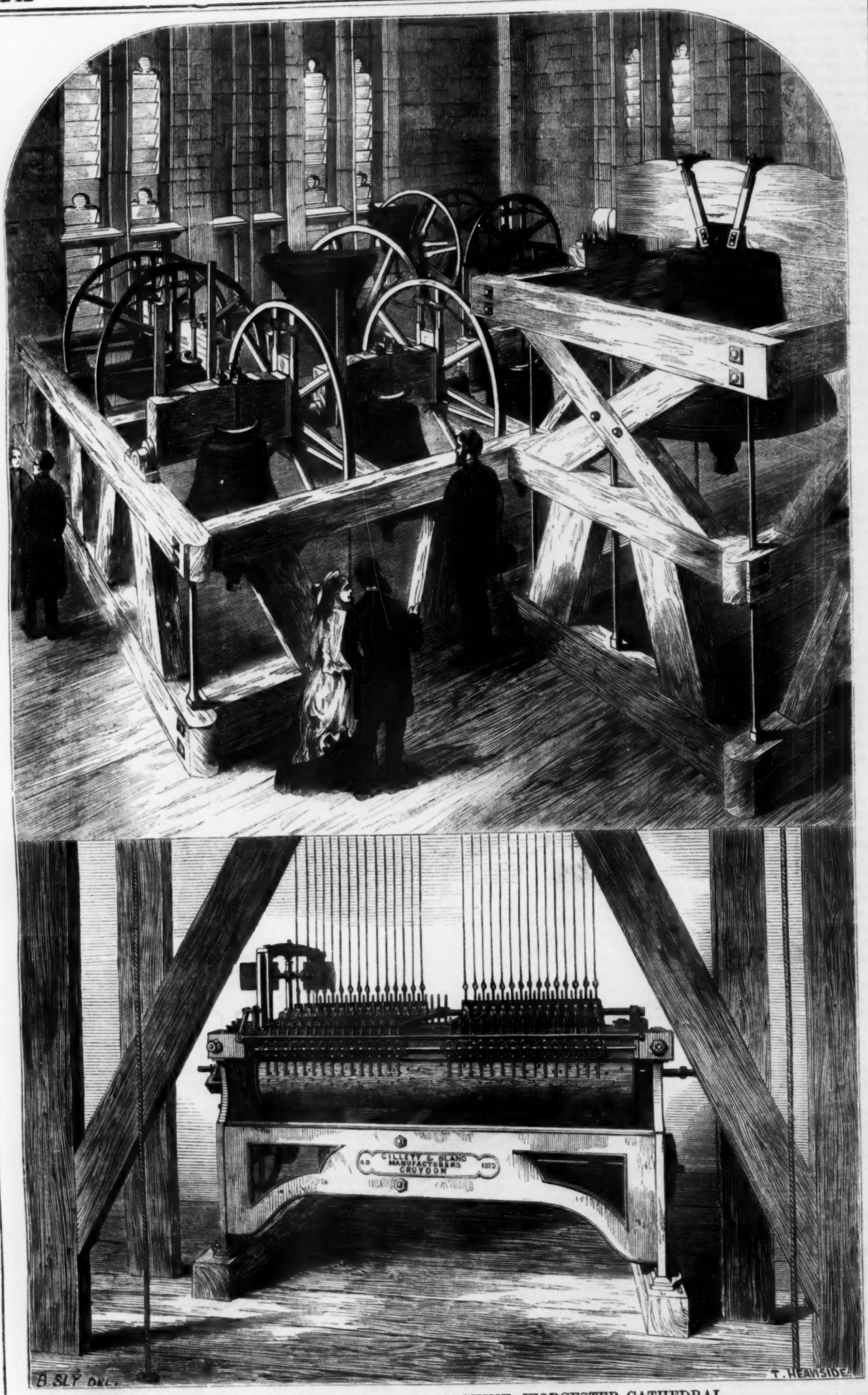
In the carving, the following emblematic flowers have been introduced, viz., the lily, lily of the valley, snowdrop, forget-me-not, ivy, primrose, violet, and daisy; whilst the fern is made to predominate, as referring to the family name, taking the form of crockets, and being the principal feature in the capitals, where the lily seems to be rearing its head under its protecting influence.

The monument is mounted on three steps, and enclosed with wrought-iron railings, picked out in gold and colour.

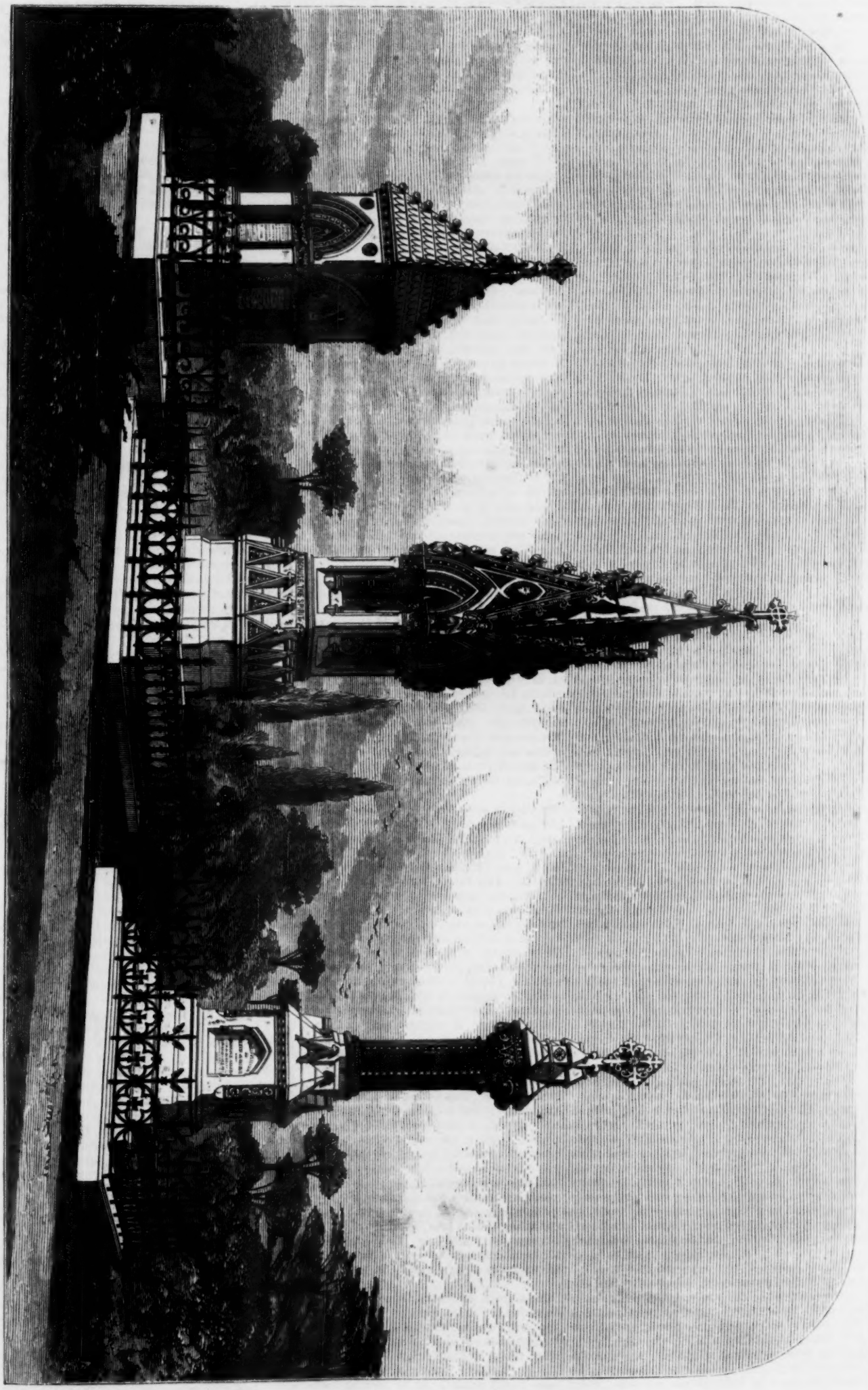
The right-hand structure is the Starkey Monument, in Bowdon churchyard, Cheshire, and is erected in Yorkshire stone, the columns being of red and green serpentine marble, alternating.

PROPOSED PUBLIC BATHS FOR ATTERCLIFFE, SHEFFIELD.

AT a meeting of the ratepayers of Attercliffe Ward, in the Vestry-hall, Hill Top, to consider the site for the intended public baths, it was proposed that they should be erected on a piece of ground near the Attercliffe bridge; but Councillor Skelton advocated the erection of the proposed baths in a more central position, and suggested, as a site, that now occupied by the Vestry-hall in which the meeting was being held. A resolution to the effect that it was desirable that the baths should be as centrally situated as possible, and that the site named by Mr. Skelton was a very eligible one, was carried.



THE BELLS AND THE CARILLON MACHINE, WORCESTER CATHEDRAL.



RECENT CEMETERY MONUMENTS.—MESSRS. HORTON & BRIDGFORD, ARCHITECTS.

HOW TO STUDY COLOURED DECORATION FROM EXISTING EXAMPLES.*

IN what I have to say to you I must, of necessity, often take you over well-trodden ground. I must often repeat to you, doubtless, suggestions which you have already heard from others or read in books. Nevertheless, I am not without hope that, whilst I shall make no attempt at saying what is very new or very striking, I may succeed, here and there, in impressing upon some of your minds certain rules and suggestions as to the use of colour for decorative purposes, which, as they are the result of nearly twenty years of practical experience, and of habitual observation, may at least receive your careful attention.

They will stand, I hope, the better chance of being received by you with thoughtfulness, because I shall in no case trouble you with any theories of my own, but shall only endeavour to point out to you what you may learn from the practice of men whose renown is world-wide, and whose works, so long as they exist, are certain to be studied,—rightly or wrongly studied,—by generations of colourists.

I must be understood as addressing myself almost exclusively to such of you as are still students, among whom, probably, not a few will make a special study of colour in connexion with architectural purposes. A special study it must be, and zealously and arduously pursued by those who hope to attain to any considerable success. And, as I shall endeavour to point out a means and method of study, I shall also presently point out what pitfalls beset the student, and into what errors he may most easily slip.

The means of study open to the student are, broadly, two,—*Nature*, and the existing works of great artists, or at least of men of acknowledged skill. The former is of course the source of all,—the widest and deepest, inexhaustible,—but precisely for that reason it presents difficulties which can only be encountered, or at least can be most advantageously grappled with, subsequently to a very careful study of the works of the best men who have gone before us. If out of that deep well of Nature others have drawn many a vesselful of refreshing beauty, surely we shall do well first to make all the use we can of the contents of those vessels which stand around the brink; and, later on, our strength will be the greater to draw for ourselves.

For this reason I propose in the present paper to deal almost entirely with the lessons to be derived from existing works of coloured decoration, and somewhat reluctantly leave aside the sister subject of "How the Decorative Colourist may Study from Nature." Perhaps at some later time I may be allowed the pleasure of saying something to you on that subject; if, indeed, no one more capable to deal with it should meantime volunteer to bring it before you. Till then I must beg you by no means to misunderstand me. Though you cannot at first go direct to nature to study decoration, you can, and must, always be studying nature along with whatever else you study. It is in the *application* of such studies that your previous lessons will be your best aid.

Even though they be obvious enough in themselves, it may be as well to repeat a few of the leading maxims which should guide the colourist in his work applied to buildings:—1. The colour must be so used as best to express the best forms and proportions of the structure of which it was applied. 2. It must also be so used as to assist the eye in recognising the structural features and motive of the building, where such exist; or, in the absence of such features architecturally, to compensate for their absence by some satisfactory substitute of division and arrangement. 3. Where a building or room is obviously defective in proportion (at any rate for its intended purpose), colour may be so used as to assist the sense of proportion, and, to some extent, to correct the existing defect. 4. Whichever of these purposes the colourist has chiefly in view, he must, above all, take care that his colours are harmonised with each other, and that his ornament, in whatever style, assists his purpose.

Having, then, in his mind some distinct maxims, which his own reason will assure him are simple and sound, the student will go on his travels with some clear idea of what it is he wants to learn. It is very necessary that he should, to some extent, school his mind to look first for that which is most important when he goes to learn from the old masters of art. He must, without chaining down his mind to them, keep these first objects of "coloured decoration" steadily in view, lest he be carried away by the charm of the detail, or by his admiration for some special or striking features of which he may easily mistake the original aim.

When he is once capable of fairly assorting for himself the various examples of beautiful decoration with which he meets, so as to recognise what *kind* of lesson to learn from each, he need place small limit upon his enjoyment and appreciation of all. Only let him early learn to use his tests fairly and with discrimination. The want of the knowledge of how to apply critical tests fairly is a very common want, and a very common cause of disappointment as to much valuable art. It is especially so with the youngest and least travelled followers of art. Often with those whose sense of the beautiful is keen, but who lack either the experience or the patience to look beyond their first quest. I venture to caution you on this head because, having started with simple maxims, you may either be led to condemn or despise all works of reputation which do not illustrate those maxims, or to think the maxims themselves in error when you find beautiful works which appear to fall short of being their examples. I would remind you, then, that the works of some artists are admirable for *comprehensive* management of colour, whilst others owe their repute rather to the exquisite fancy of their ornament, or the beauty of their colouring *in detail*, than to the success of the general effect, or to the advantage which the building itself derives from them. There will, therefore, occur to you many admirable examples which will *not* teach you that which, as colourists, you most want to learn. Do not on that account despise them; because you will often find in them much to delight and benefit you when you look at them as ornamentists, or even as artists.

Having, however, warned you against a fanatic abuse of maxims, I must revert to them to insist upon their value in weighing the lessons to be derived from each example. If you keep them well in view you will not refuse to admire every work which does not fulfil your chief requirement, because it is only exquisite in fancy, in detail, and in execution; but you will not commit the error of mistaking the source of your admiration; and if you study it, you will assign to it its proper place in your mind and memory.

Admitting, then, that your first object will be to learn how to make your colouring and surface ornament advantageous to your structure, we will leave out of account for the present special charms dependent upon detail or delicacy of execution, and will seek, rather, a few examples in which we may be able to recognise certain aims, and certain results attained by the colouring. We are in the position of being obliged to deduce the original intention from the result; but, if we are careful in so doing, the lesson may be almost as valuable as if we really knew the artist's mind; and the mere fact that we are *able* to deduce an intention from the result in any particular example, will show that the example is worth careful study.

Without, then, breaking off to catalogue a set of rules by which certain results may be attained, I will point out each rule where it is exemplified, thus saving time and your patience.

Now, I may as well at once tell you that my examples will, for the most part, be drawn from works in Italy; and this for a very simple reason,—that Italy possesses far more numerous and beautiful examples of coloured decoration than any other country in Europe; and not only this, but these examples come to us, in many cases, signed by the great names which have influenced all modern art, and before which we all willingly bow. Let me hasten, however, to reassure those whose enthusiastic predilections make the name of "Italy" as a reproach in their lips.

I shall endeavour to remember that, as Mr. White has told you, "Queen Anne" is *not* dead after all; and I shall hope at once to conciliate *some* of my friends, at any rate, by selecting as my first example a Gothic church of (shall I say the *best* period?) the thirteenth century.

The upper church of St. Francis-Assisi was begun in 1228, two years after the death of the saint, and was completed in about twenty-five years by a German architect. Its coloured decoration was carried out from thirty to forty-five years later. The church is rather over 220 ft. long, divided into five vaulted bays, and a short choir; the width is 36 ft. (making each bay nearly square); and the height 60 ft. Clustered columns, attached, support the vaulting. The absence of mouldings on the groining-ribs, and the large plain surfaces of wall, sufficiently show that this interior was always intended to depend on surface decoration for its finished effect.

The enthusiasm, which had been awakened among men of all conditions by the preaching and example of the saint, was to be kept alive by depicting on these walls, in full view of the pilgrims to his shrine, incidents from his life side by side with others from the Old and New Testament.

At a height of about two-thirds the length of the columns a string-course divides the height of the walls. This is the only moulded division. The Biblical subjects are above this line in two tiers; the Franciscan subjects below it. All separating margins or divisions of the subjects (with the one exception already named) are in coloured decoration.

You will see, then, that the whole of the walls are covered with colour, either pictorial or merely decorative; but, besides this, the roof also is made a field for colour, and even the windows are entirely filled with stained glass.

Now, you will almost have gathered from this rough description of the general conditions that, where such enormous surfaces of pictorial art were to be displayed, the decorator would be placed between two difficulties. If the pictures be not distinctly divided or framed, and the structional features be not clearly defined, a sense of confusion will be produced. If, on the other hand, *too* emphatic a colouring be used for the expression of the structure, there is a risk that the subjects may assume a more subordinate place than is demanded for them.

How, then, did the artist steer between these difficulties? I will endeavour to point out. Taking the walls first, he divided the various tiers of subjects by broad bands or friezes, finishing below with a diapered dado. These bands, though having a ground which contrasts with the predominant tone of the pictures, present a by no means hard contrast, because other colours, also present in the picture, are introduced largely in the ornament. Clearness is thus obtained by the *width of the margins*, not by the abruptness of their contrast; whilst value is given to the colouring of the pictures by keeping the general tone of the borders, especially that of the ground-colour, *lower* than the leading tones in the pictures; but, in guarding against confusion or undue monotony in the pictures the artist adopted another and still more important expedient. Among some memoranda which I made in the church some fifteen years ago I find the following:—"The frescoes of the upper church have *each a predominant* colour,—the upper series chiefly blue. The lower range have blue, yellow, and red,—the first in the largest proportion." Each is framed by a maroon line; and descending to the dado, we find various diapers of yellow, maroon, green, &c., but a total absence of blue. Thus, not only are the pictures of each bay framed by the wide margins I have mentioned, but the individual pictures vary in predominant colours, though the colours themselves are always in the same scale. Besides this, the predominance of blue above diminishes to nothing below.

The pictures, therefore, are well separated, but maintain a certain unity of effect throughout the bay. We now come to the separation of the bays one from another. There is a wide arched soffit next the wall, framing the whole group of the upper series. This soffit is again in the somewhat quiet "tertiary" tones of the margins, which, as we shall see, are repeated in the vaulting. In this soffit the brighter tones are introduced at intervals by means of pictorial medallions,—a connecting link with the pictures, again avoiding abruptness.

There remain now the vaulting, with its ribs and ceiling, and the clustered columns from which the ribs spring. We take the vaulting, and find an uncommon treatment. The ribs themselves would have appeared hard and "liny" if left to themselves to mark the structure, so they are supported on each side by wide borders of similar colouring to the margins below,—another substitution of *width* for force of colour, observe!

Then we find the ribs themselves diapered in the primary colours and white, so closely sub-

* By Mr. John D. Crace. Read at the Architectural Association, as mentioned in our last.

divided as to be somewhat subdued by each other. Thus, again, recalling the pure tones of the pictures, only with more intensity. But when we come to the ceiling panels, we find that the bays are *alternate* in colour and treatment. The panels of one bay are blue, powdered with gold stars. In the next they are yellow, but largely occupied by big medallions, with figures, or by single throned figures in colour.

"Why this alternation?" you ask. I take it to be this. You have a long building rather low for its other dimensions, thus bringing the ceiling conspicuously into the perspective view. Had the ceiling being all blue, with gold stars, one can feel that the effect would have been to give that colour undue preponderance, to the detriment of the wall pictures. Not only this, but the eye, catching the perspective of the pendentives, would have been arrested by the mass of blue in which it would find a lack of interest, vertically. The impression produced would have been such as to reduce the height of the already low building; whereas, by interrupting the longitudinal perspective of colour, the eye is led to pursue its researches vertically; and in this is still further encouraged by the medallions, or subjects, which are introduced with just sufficient frequency to give them fresh interest and point.

The clustered columns remain. These form the division of the bays, coming between the lower strata of pictures. From them again blue is excluded. I am sure that some of you will be horrified at hearing that these shafts are painted in imitation of marble, and of inlaid marble-mosaic alternately; and this by the artists who painted all the other work which I have been describing. Gentlemen, I wish I could console you by telling you that these artists, whatever their merits, belonged to a decadent and debased period of art; but it grieves me to be obliged to say that they lived and painted in that golden age of art, the thirteenth century, and their names were "Cimabue" and "Giotto." If we review the whole, we find a building glowing with pure colour, alive with pictorial story, and illuminated by gem-like glass. The pictures tell their story with unbroken surface, but without confusion or monotony. The tones of colour are of the purest, yet there are no harsh contrasts; for even in the vaulting, where the alternation of blue and yellow occurs in large masses, it will be found that the ribs which divide them, in themselves, contain both colours. The conditions are unusual, but the treatment is also original and well studied, and one from which we may take many valuable lessons.

Now there are some of the features which I have alluded to in the foregoing example, which you will find as well, or even better, illustrated in examples elsewhere. Such, for instance, as the soffits of arches, or the margins surrounding pictures, in which the colouring is made at once to define and set off the picture, and which yet have some colouring in common with it, introduced by medallions or otherwise. Good examples occur (still of the Gothic character) at Prato, at Florence, at Sienna, and at Bologna (St. Petronio), besides in many other places, as well as in the later styles of art.

Again take the treatment of the vaulting ribs. We have seen that at Assisi it was deemed desirable to strengthen these by adding to them *wide* margins, rather than by forcing the contrast upon their comparatively narrow surface, which, where the building is very high, or very long, would leave them looking thin and wiry. Yet we find the same artist, Giotto, so well aware that the change of these conditions allows and invites a change of treatment that in his decoration of the vault of the private chapel of the Popes at Avignon (which is, if I remember rightly, a single square chamber), he throws every possible vigour into the dividing rib, marks its lower edge in black and white, confines his tertiary maroon and green to the side hollows; and, satisfied with a couple of inches of added margin, boldly frames his blue ceiling with a bright red band. Why? Because he wants to lead your eye upwards, and to take care that you shall not only see his frescoes on the wall below; but that, having seen those, your attention shall glide up that narrow, but attractive path, to find the four figures which he has painted in the four divisions of the blue, star-spangled ceiling. Why, you ask, may the strong, direct contrast be permitted here rather than in the longer church? I reply, because in the longer church the perspective will bring your rib across, or very near to, a succeeding picture, to the latter's detriment, and that here the space does not allow of this perspective. Not only this, but in this chapel you are so directly under the vault that your eye needs a stronger inducement to look over head, and this inducement is more readily obtained by using *bright* red in a *narrow* margin, than by using *dull* red in a *wide* one, and *that* without necessarily affecting the balance of colour. I take a third case, in which the wide margin of quiet colouring is used on each side of the rib, but the rib itself is much more clearly defined, having, in fact, its side facets panelled out in bright red, and bright blue, alternately, in short lengths, with a band of green dividing the lengths, the lower face being treated as marble-mosaic. This example is in the choir roof of Sta. Croce, at Florence. In what respect do its conditions differ from both the preceding examples? In the first place, these ribs divide the vaulting of the choir at the *end* of the church only, and are, therefore, *not* foreshortened one against the other. Secondly, they are seen from the extreme end of the church; therefore, most often at a considerable distance. Thirdly, they are seen *against the light*, for the fine east windows of the choir are directly facing the spectator, and immediately below the vaulting in question.

I have dwelt with something like undue length upon one decorative feature, because this, as well as any other, serves to show the spirit in which art must be studied from examples. If you simply go from one example to another, taking notes or sketching, as each pleases you, but *not* well considering the reasons for which it is good in its own place and conditions, the chances are that you will derive but little advantage from what you admire; and will remember your examples only to misapply them.

Let us now consider a different set of decorative examples. I mean the colour treatment of surfaces which do not possess much architectural form or feature, or in which the divisional arrangement of the surface has depended upon the ornamentist rather than the builder. These instances abound in Italy, and it is among them that we find the greatest decorative triumphs, the most wonderful subtleties of harmony, and the most playful and delicate fancy.

I will first call your attention to one of the best known decorations of this kind—the vaulted roof of the Stanza of the School of Athens. The great frescoes which occupy the walls are, as you know, Raffaelle's masterpieces. He had the Pope's order to paint out this ceiling (by Sodoma), and substitute one of his own; but he replied that he would rather abandon the whole commission than destroy so fine a work. You will see that the subdivision of the vault is entirely arbitrary, and yet admirably calculated to explain and give strength to the form. The broad gold margins, which divide the whole and frame the pictures, are well toned by the arabesque in red, and indigo blue, upon them; while they gain in vigour from the lesser borders of deep blue which surround the secondary panels. Yet you will notice that these blue borders are *not* allowed to come next the gold, nor even next the stucco moulding, for they would then *chill* the gold—gold being very sensitive in borrowing from adjacent tones of colour—but a narrow strip of quiet red and gold is inserted between them, and this, almost unnoticed itself, adds value to both.

Let us pass next to a smaller, but very beautiful, example of decoration of the same form of ceiling by Pierino del Vaga, at Genoa. It is an open Loggia; and therefore, please remark, the surroundings are exposed to very strong effects of sunlight and shade. On this account it has been necessary to express the leading divisional lines with emphasis. How simple is this division, and how satisfactorily expressive! Observe, too, that, lest this deep-blue margin should cut too harshly against the panels, it is toned by a refined and delicate interlaced ornament of gold.

Notice how size is obtained by throwing the most sparkling colour and finished detail into the framing-bands which enclose the whole. With what art the maroon panels, so boldly used at the four sides, find a recall in both inner and outer margins. Again, how the spreading gold panel of the springing is toned, firstly by etching the ground (like mosaic) for depth, and then *cooled* by the stone-colour ornament; by the greater width of moulding; and lastly, and most subtly, by the addition of a fine green line between the latter and itself. This in its way is a gem of decoration.

There is an adjoining chamber (the Sala dei Giganti) decorated by the same artist, in which again he shows his knowledge of colour treatment as applied to the expression of form. Without the pictures to give the colouring of the walls and ceiling, you will hardly appreciate the value of the colours in the side-vaulting of the cove which divides the two. Still you will see how gracefully the constructional lines are marked out by the red margin. The almost indigo-blue carrying up the deep colouring of the wall-pictures without disturbing them; and connecting links between that and the picture of the ceiling are obtained by those blue-margined panels which break the yellow and white frame. In that frame, or frieze, you will also not fail to note that the red is present again—this time only in narrow lines—but even these were indispensable. And upon both these colours, where the size admits, a delicate gold pattern is traced, in no way disturbing the continuity of the colour, but serving a most important end in softening both, one to the other, by the introduction of something common to both.

This introduction of some third common colour, or set of colours, upon both of two grounds which are strongly contrasted, is a very valuable expedient; and the stronger the contrast, the more necessary is it to adopt this or some similar course. I may refer to a ceiling of deeply-moulded panelling in the Farnesina Palace at Rome. The dividing framing has its lower flat surface deep blue, upon which is a gilt fret. The moulded sides are gilt throughout; whilst the greater part of the panelling is painted in alternate grounds of bright red and rich green. *Bare* they would be intolerable, having all the crudity of two complementary colours; but each has its surface extensively covered with closely-painted arabesque ornament; and this marvellously tones both,—as much as, and more agreeably than if the various colours of the arabesque had been stirred up with the red, or the green, on the palette. You will also bear in mind that the gilded mouldings catch many a side reflection from the panels which they surround; thus establishing a sort of relationship with them.

The next decoration which I will bring to your attention, is a work of Ghirlandaijo's—a small private chapel in the Palazzo Vecchio at Florence. It is a capital example of skilful division by means of colour; and of a resulting rich but sober effect. The prevailing tones may be spoken of as drab, gold, and blue, and the form of the chapel as an oblong 22 ft. by 14 ft. 8 in., with a little choir of 10 ft. square added. The ceilings of both portions are plain, segmental, wagon-headed, quite unbroken by mouldings, but springing from a projecting cornice and frieze.

The walls are of the drab tone, broken by some gilding; but, except in the choirs, the upper part of the wall was evidently hung with some kind of tapestry or needlework, the hooks still remaining. The ceilings, however, present the great attraction. Each is skilfully set out into panels of various shapes. The whole of these have gilt grounds. Then certain of them, forming the more set design, are pictorially treated with figures in colour, whilst the remaining panels are made subordinate by having drab-coloured scroll arabesques painted on them, as if in relief. The dividing margins are blue, with points of gold marking the intersections, and being framed with a gilt "fillet" on either side. Black is introduced with great skill in only two or three places, and performs a valuable part in clearing the drab, and lighting up the blue. The whole presents a delightfully mellow and harmonious example, and it deserves careful study. I will ask you to notice how usefully the blue band of the frieze girts the whole together, and improves the spring of the arch. Another expedient may be observed in this work, as in many others; but here with peculiarly good result. I mean the cross-hatching of the gold grounds, which not only softens the gold, removing the hard glare, but gives *surface*, enabling the eye to better recognise its true plane, a not unimportant matter for attention in many situations. The idea is evidently taken from mosaic work, and shows that these masters took careful note of *how* effects were produced. And, indeed, we shall ourselves do well to study carefully such old mosaic decorations as fall in our way; even if we have no thought of making use of the material. Many of the old Mosaic ornamental treatments were carried on for generations, and tradition by degrees established certain rules of outlining against gold grounds, a detail of much importance, and much neglected. The outline has enormous power in determining the warm or

cold tones of the whole; and a gold ground may be made to appear luminous or sombre, warm or cold, entirely by the outline used next to it.

I might pursue the subject of coloured decoration through endless detail, and a multiplicity of examples, but I believe that I need not ask you to extend your attention to me longer. My object in the present paper is not to attempt to point out to you every example worth your attention; nor even to catalogue the various forms of excellence which may be found in existing examples.

It is rather to caution you against limiting your powers of observation and enjoyment by a false use of rules or theories, good in themselves (as guides), but easily capable of prejudiced or unthinking application. It is to advise you to carry such rules carefully and clearly in your mind, but to use them with *thought*, not with *prejudice*, which is *such an easy* substitute.

Keep fresh your power of admiration, and subject each object of it to many tests if you will, but apply them fairly. Try to suck something of value from whatever you can admire at all. Do not determine to see *no* good in each thing which you cannot admit to be perfect. After all, how few can hope to attain more than a very small amount of excellence in art; but how many may and do contribute their mites of gratifying beauty. To know how to select these is better than to pass them by.

Well, then, I suggest to you that you shall, with every example of decoration which you believe to be worth study, carefully resolve in your mind whether its chief merits lie in harmonious colouring, or in constructive expression, or in skilful division and arrangement. Whether it expresses well existing structure, or provides a satisfactory substitute.

Whether, again, if the colouring be weak, or disconnected, or barely harmonious, there be any special charm in the forms or execution of its detail; or delicate fancy in place of more solid qualities. Satisfy yourselves how far any special features or colouring may be intended to meet some special circumstances of light or other accidental conditions. In doing this, you will render any sketch or notes you may make of double value to you; for many a man's sketches have proved a bane to his work through carelessness in a comparison of outward conditions. Above all, try to keep your mind clear of prejudice and foregone conclusions; for we are, each of us, far too apt to shut up our minds to all but one form of beauty—the particular form of beauty allowed by our own "set,"—who seem to be perpetually writing over their ideal, "None else is genuine."

Let us, then, sum up what my advice to you amounts to. I advise, in the first place, that you should carefully weigh your admiration by means of your judgment, to this extent,—that you shall in every case in some degree account to yourself for your admiration; and so also with your criticism, that you shall modestly restrain it, not allowing your discovery of one weakness, even in some important particular, to blind you to many remaining beauties. It is the failing of the *half-taught* to make their criticisms too sweeping; and too many of us are far too ready to turn our backs altogether on many a beautiful thing which fails to satisfy some particular theory to which we have, in our own narrow circle, given a possibly inordinate value.

Believe me, your faculties, both of admiration and of criticism will be *most* useful to you when in harness. Only remember, that it is by *extending*, and not by *contracting*, your power of admiration that you can add to the happy side of your life.

A NEW THEATRE IN SOUTH LONDON.

ANOTHER new theatre, of large dimensions, is about to be erected on the Surrey side of the Thames. In connexion with the building there will also be an extensive restaurant, containing dining and refreshment rooms, together with a large smoking-room, in the upper portion of the building over the dining-room, in addition to cloak-rooms, lavatories, and ladies' and gentlemen's retiring-rooms; whilst on the top floor, adjoining the gallery, there will be a commodious kitchen. The building is being erected by a capitalist, with a view to the formation of a company, and the name of this new dramatic temple is the Imperial Theatre. The site is in Newington Causeway, about midway between the Borough-road and the Elephant and Castle, on the premises formerly occupied as steam wheel works, the freehold land having been purchased for the sum of 8,000*l*.

The designs for the building have been prepared by Messrs. Elliott & Warren, architects, of Parliament-street, and workmen are now employed in the necessary excavations, and getting in the foundations, preparatory to the ceremony of laying the memorial stone, which it is expected will take place in about a month from the present time, and the building is to be completed and ready for opening in the autumn. The style of architecture adopted is modern Venetian Gothic. The extreme height of the elevation from the street level to the roof will be 80 ft. The elevation will be faced with white Suffolk brick, Portland stone being freely used for dressings and ornamentation. Between the windows, which will have arched stone headings, there will be pilasters, also in stone. In the centre there will be a large mullion window, opening out to an ornamental balcony in terra cotta. Right and left of the central window there will be niches for full-length figures in stone, the one representing Tragedy and the other Comedy.

Within, the horse-shoe plan will be adopted in the construction of the auditorium, and the size of the building will be seen when it is stated that it will admit of accommodating an audience of between five and six thousand, independently of the large space occupied by the restaurant; whilst under the pit there will be a spacious canteen, the access to which from the pit, will be altogether distinct from that of the restaurant. The auditorium portion of the interior will include about one hundred stalls in front of the pit, whilst on each side there will be four tiers of boxes, the central portion containing the upper and lower circles, and balconies. The height of the interior from the pit to the ceiling will be 60 ft., the span of the ceiling being 68 ft. It will be domical, and will be painted and decorated. In the centre there will be a large sunlight. The proscenium will be 40 ft. in height, with an opening 32 ft. in width, and the depth of the stage will be 70 ft. There will be two sets of flies, and the depth from the stage to the basement, or stage cellar beneath, will be 16 ft., thus admitting of a whole flat being lowered out of sight. At the back of the stage, and directly connected with it, there will be a distinct and separate building, in the basement of which will be the property and carpet rooms, green-room, actors' lavatories, and scene dock. The treasury and the manager's offices will be on the ground-floor, the wardrobe and dressing rooms on the floor above, whilst above these again will be the painting-room and the carpenter's shop. This block is already in course of erection, and considerably advanced towards completion, the object being to admit of preparations being immediately commenced with the scenic and other arrangements in anticipation of the opening of the theatre in the autumn.

The restaurant will be situated between the pit and box entrances in Newington Causeway. For the purpose of ventilation there will be thirty-two air-shafts carried through the walls, and in addition to these there will also be a large shaft above the sunlight in the ceiling for the purpose of still more effectually giving an outlet for the heat. We understand that the company intend to apply to the Metropolitan Board of Works for permission to erect a portico in front of the building extending across the footpath.

The estimated cost of the building alone is set down at 40,000*l*., which, together with 8,000*l*., the price of the land, will bring up the aggregate cost of the establishment to nearly 50,000*l*. The contractor for the work is Mr. Wheeler, of Grove Park, Chiswick; his son, Mr. Wheeler, jun., acting as clerk of works; whilst the general manager and superintendent is Mr. Page.

The Peabody Trust.—The report of the Peabody trustees shows that they had expended up to the close of last year in land and buildings 300,000*l*. Upwards of 66,000*l*. of this sum are at present unproductive, as two sites are not yet built upon, and the dwellings upon two other sites are not finished. The number of families now in residence at the trustees' buildings is 882, occupying 1875 rooms. The average rent per room is 1s. 10d. per week, and the average weekly earnings of the head of each family is about 1*l*. 3s. 1d. The net income derived from the buildings is about 2½ per cent. per annum on the outlay.

LARGE AND SMALL HOSPITALS.

AT a recent meeting of the Social Science Association, Dr. Charles Shrimpton read a paper on the subject of Hospitals generally, in the course of which he said,—So much has been written on hospitals and ventilation, by the highest and most competent authorities of our day, that the subject may appear exhausted. The principles of hygiene and hospital improvement are established and accepted by every one, yet we all know how difficult it is to apply these principles in any way that may take us out of our routine and disturb the habitual order of things. The most effective means of escaping from this routine is, I submit, in making known, as far as possible, the existing evils, and in inquiring in what direction any hospital improvement may be working itself out. This is the task I have before me, and, though I may touch on some salient points, I cannot hope to do more than, perhaps, give a little impulse to a general movement.

Allow me to take as examples the hospitals of London. They are large, spacious buildings, containing from 150 to 730 beds each. Everything is most amply provided by the most generous contributions, and the patients are attended by the most scientific and skilful medical men. The largest and oldest of these hospitals, when they were first built, were in the open country, surrounded by fields. These fields are become populous districts. The hospitals built in on every side, become larger and larger as the population increases. The hygienic conditions of these establishments have thus become greatly deteriorated. They have lost, in a considerable degree, the advantages they have originally enjoyed, and the aggregation of so many sick in hospitals in large towns is a continually increasing cause of insalubrity for the general population. The atmosphere floating over large populations must inevitably be corrupted, so that the hospitals placed in their midst cannot obtain pure fresh air from without, whilst the patients themselves are infecting the atmosphere within in proportion to their number.

The large hospitals in towns are thus become unfit for the reception of the sick; they absolutely defeat the object of such institutions by delaying the cure of the sick, and by exposing them to the danger of contracting other diseases, erysipelas, pyæmia, and hospital gangrene, diseases generated by the hospitals themselves. Are we, then, to do without hospitals? We most assuredly must have hospitals, and we must find security in them for the treatment of the sick: there must be no such thing as hospital diseases.

The large hospitals in towns will, we believe, be gradually, and of necessity, replaced by an exactly opposite state of things—small, or cottage hospitals, in the country, in communication with a number of depôts, conveniently placed in town, to receive the patients and transmit them to the country. A system of this kind would place the patients in the most favourable condition for their recovery, and respond to the requirements of the increasing population continually spreading over large areas.

In hospital arrangements and management we must be guided by the sole object we have in view—the recovery of the sick. All good hygienic measures, hospital conveniencies, and comforts should be combined by the hearty co-operation of the whole hospital staff for the benefit of the sick. Every consideration should yield to this guiding principle; the hospital itself should be sacrificed if, from circumstances over which we have no control, the site should become unhealthy. The sole economy by which we can be guided is the economy of life and suffering.

The first condition of hospital hygiene is its site in a healthy, airy situation in the country, so that thorough ventilation may be established; and, for reasons just given, hospitals should be small, containing not more than thirty or forty beds at the utmost. The number of these small hospitals might be increased to represent the number of beds required, each small hospital being separated from the others by gardens and trees, thus forming a village of small or cottage hospitals two stories high, and communicating by telegraph, pneumatic tubes, and tramways on inclined planes, with the principal offices established in the centre of the group. The church being also placed in the centre of the cottage hospitals, all the dependencies—washhouse, laundry, bakehouse, &c.—might be conveniently established a little beyond the group.

This village of hospitals would be in connexion with the depôts in town, within reach of the sick, who could thus obtain immediate assistance, and be sent into the country by services conveniently arranged for that purpose.

Everything new seems at first sight difficult. As soon as we see it in operation all the difficulties vanish, and so it will be when we see this change working itself out. But there is nothing new in the plan I have ventured to sketch. Mr. Whitfield, of St. Thomas's, most powerfully advocated a plan of this kind in 1862, in proposing the transfer of St. Thomas's Hospital to a suburban site, Lewisham. Unhappily, his arguments did not prevail, and there is no doubt that many persons who are really interested in the hospital regret the enormous outlay, which might have been spared with immense advantage to the patients and to the hospital.

That the London hospitals will, however, be transferred to the country there can be no doubt if our object be the recovery of the sick. We learn from the Registrar-general's report that the mortality in hospitals is in proportion to the population of the towns in which the hospitals are placed; and, again, Sir James Simpson's statistics show that the mortality, after amputations, is much greater in large hospitals in towns than in small hospitals in the country and in country practice.

Out of 2,089 major amputations in large hospitals	825 died.
Out of 2,089 major amputations in the country	226 „
Leaving a balance of	599

that would not, in all probability, have died if all the patients had been operated on in the country. Can anything be more conclusive than this?

The accuracy of Sir James Simpson's statistics has never been contested in regard to the large hospitals, and, though the statistics from private and hospital practice in the country may have been impugned on account of the variety of circumstances under which the cases had to be collected, it is admitted by every one that Sir James was most scrupulous in his inquiries into all these cases. Even admitting that some slight error might have crept into the statistics of country hospitals and private practice in the country, the advantages of country hospitals will remain confirmed by the Registrar-general's report, and by the hygienic advantages acknowledged and appreciated by all medical men.

Without doubt Sir James Simpson chose the major amputations as the best test of the sanitary conditions of hospitals; but there is another test far more conclusive than amputations, and that is child-birth.

By far the greater number, if not all, the large hospitals have been obliged to close their obstetric wards on account of the mortality of women in child-birth, whilst we find that, in the little wooden hut open to all winds, on the edge of the cliff at Shorncliffe, up to December 29th, 1869, there had been 702 deliveries without one single death from puerperal disease.

At Colchester Lying-in Hospital, an ordinary officer's wooden hut, up to October, 1870, there had been 202 registered deliveries and no deaths. Is not this sufficiently conclusive in favour of the small, and condemnatory of the large, hospitals?

With this evidence before us can we be justified in accepting the confidence of the sick who demand admittance to our large hospitals, implicitly believing that in these large establishments they are in greater surety than anywhere else? This is a very unhappy delusion. Assuredly, then, it is a cruel deception if the principles of hygiene are not most rigorously observed in institutions of this kind. Let us take the case of a poor man confiding himself to the care of the most skilful surgeon and scientific physician, and who, instead of being restored to his family, as he confidently hoped, in a few days, should be carried off by a disease engendered by the hospital to which he had so trustfully come for cure. Diseases of this nature are inseparable from the agglomeration of large numbers of sick under one roof. It is certainly difficult, and it is deemed almost impossible, to prevent the agglomeration of sick in hospitals in large towns. The principal obstacle to be overcome appears to lie in the nature of the institutions themselves, each hospital having its own invested rights and privileges, by which it is kept in a groove of routine passively opposed to any great change. But the oldest and largest hospitals in London,—St. Bartholomew's and St. Thomas's,—what changes have they not seen since their monastic origin? They are protected and ruled by charters, it is true; but were not these charters, whatever be their date, granted them on their entering into a new existence, to protect them from the then obsolete laws? May we not ask if these charters, in their turn, are not become obsolete, and if these hospitals are not again called into a new state of being corresponding to the progress of our time?

Westminster, St. George's, and all the hospitals of more modern date, were founded by bequests and donations, and supported by princely contributions, which are being constantly renewed by contributors of the present day, who necessarily will require these establishments to keep pace with the progress of their time.

There is only one hospital, I believe (Guy's), which owes its foundation principally to one or two benefactors, giving it a sufficient endowment, and appointing its form of government. It seems impossible that Mr. Guy, whose sole object was that of philanthropy, and Mr. Hunt, who, moved by the same feeling, left nearly 200,000*l.* for the enlargement of the hospital, could have intended anything but that the greatest benefit to the sick should be obtained with all the advantages of the progress of science, and the development of sanitary hygiene could procure.

The governors and boards of management of the different hospitals, impelled by the grave responsibilities of their office, and the honour of the establishments they have so generously taken under their protection, will not long resist the movement which is making such rapid strides in the improvement of sanitary measures on every side.

Ventilation dominates all other hygienic measures. Unhappily, *ventilation* is too little known and appreciated. It is frequently not even understood what is meant by ventilation; for instance, we often hear persons speak of a room as being well ventilated, because it has so many doors and windows. This is an illusion; for, if the doors and windows are kept closed, where is the ventilation? The atmosphere of a room may be changed, it is true, by opening the doors and windows; but this is not ventilation. Ventilation consists in the constant renewal of the atmosphere of a room, or ward, when the doors and windows remain closed. But people complain of cold, an idea inseparably connected with the thought of ventilation. This is a fatal error for it is by breathing pure fresh air alone that healthy warmth, animal heat, can be generated The constant renewal of the atmosphere of a room should be obtained without loss of temperature. But how is this to be accomplished? Most assuredly not by any complicated machinery, steam-engines, &c., to furnish given quantities of air at given temperatures; air cannot be meted out to patients, they cannot have the atmosphere of their wards renewed too much, and the renewing air should never be heated. Heated air loses its vivifying property. Machinery of every description is quite objectionable. It will, some time or other, get out of gear, and the patients may at any moment be without any renewal of the atmosphere of their wards. How, then, are we to secure the constant renewal of the atmosphere of the wards? By the most simple means possible. By making large openings, say 1 ft. 6 in. in length, by 6 in. in height, through the walls of the building. These openings should be closed on the outside and on the inside of the walls by metallic gauze, or plates of perforated zinc, allowing the air to be sifted from without into the space between the two pieces of gauze. From thence the air will be drawn into the room or ward as may be required, self-regulating, according to the change which may have taken place in the atmosphere of the ward. There is no loss of temperature from these openings through the wall. The air in the space between the two gauzes, being a non-conductor of caloric, protects the internal temperature from the variations of the external atmosphere. The only change of temperature is from the fresh air admitted, which is always an advantage to the sick, when the openings are properly placed. The proper place for these openings is between the ceiling and the window, over each window; the windows, opposite each other, always with eastern and western aspects, occupying the space from a few inches below the ventilator to about 3 ft. above the floor. Wards should not be large, never containing more than eight or ten beds, allowing to each bed an area of 12 ft. by 8 ft., and 1,400 cubic feet. The cubic space proposed may appear small. I would observe, that the value of cubic space depends entirely on ventilation. Too large a cubic space cannot be well ventilated, nor can the temperature be properly regulated; but a small cubic space can be compensated for by increased ventilation.

But, we may be asked, what becomes of the foul air? Air, subject to the law of all fluids, finds its level according to its weight, if it has communication with the general atmosphere. When the wind blows, and there is greater pressure on one side of the ventilating openings than on the other the sulphuretted hydrogen and lighter gases, always rising to the ceiling, escape through the ventilators on the opposite side, as we see smoke escape from the upper part of one window when the opposite windows are opened in a smoky room. The carbonic acid gas which, on account of its weight, occupies the lowest stratum floating over the floor and around the beds, when the atmosphere of the ward is not agitated, is more easily carried off by the draught up the chimney of an open fireplace. There should be a number of small openings in the lowest part of the panels of the doors, so that there may be a continual draught sweeping the floors and carrying off the noxious gas. We cannot be too careful in renewing the atmosphere of the wards of a hospital, where there must be many patients who would inevitably poison the atmosphere of their neighbours, if these simple measures of ventilation were not attended to.

ASSOCIATION OF MUNICIPAL AND SANITARY ENGINEERS AND SURVEYORS AT LEICESTER.

ON Saturday last, a well-attended meeting of the members of the Association of Municipal and Sanitary Engineers and Surveyors, was held in the Mayor's parlour, Town-hall, Leicester, under the presidency of Mr. Lewis Angell, Mem. Inst. C.E. (President of the Association), when there were also present Messrs. J. Lemon (Southampton), Assoc. Inst. C.E. (Vice-President of the Association); C. Jones (Ealing), C.E. (Honorary Secretary); E. Pritchard (Warwick), Assoc. Inst. C.E. (Honorary Secretary for the Midland Counties); R. Vawser (Warrington), Assoc. Inst. C.E. (District Secretary for Lancashire and Cheshire); and E. L. Stephens (Leicester), C.E., all of whom are members of the Council of the Association. The following members were also present: — J. Proctor (Bolton), E. J. Purnell (Coventry), R. Davidson (Leamington), E. R. S. Escott (Halifax), J. H. Hall (Canterbury), H. Walker (Basford), J. Lobley (Hanley), A. Comber (Kidderminster), R. Hodge (Plymouth), E. Betteridge (Balsall-heath, Birmingham), E. Clavey (Burton-on-Trent), G. Hodson, Assoc. Inst. C.E. (Loughborough), W. Batten (Aston Manor, Birmingham), E. Monson, Assoc. Inst. C.E. (Acton), E. Sharman (Wellingborough), T. T. Allen (Stratford-on-Avon), E. Davey (Maidenhead), J. Davis (Oldbury), and J. Baker (Assistant Surveyor, Warwick). The visitors included Messrs. T. Stoper (Architect and Surveyor, Winchester), W. Humber, Assoc. Inst. C.E. (London), W. Boon (Coventry), T. Coltman (Borough Accountant, Leicester), &c.

The minutes of the last district meeting of the Association, held at Leamington, were read by the Honorary Secretary, Mr. E. Pritchard, and confirmed. Mr. Pritchard then read a number of apologies from gentlemen who were unable to be present.

The Water Works.

The members afterwards proceeded in vehicles to the Bradgate Water Works. By the kind permission of the Earl of Stamford and Warrington, they were allowed to drive through Bradgate Park: thus giving a full opportunity of seeing the reservoir and catchment area. The reservoir, which is a very long one indeed, contains about 500,000,000 gallons. It is constructed by a contour line being drawn over the water level and a very deep embankment. At the foot of the ravine are placed engine-house, four filter-beds, pure-water tank, by-wash, engine-house, and buildings. The engine-house contains two splendid steam-engines of the Wolf description. The works generally are elaborate, and have been successfully carried out by Mr. T. Hawksley, at a cost of somewhere about

140,000*l*. By the kind permission of Mr. E. S. Ellis, the chairman of the Leicester Water Works Company, the members were allowed to visit the works, and the manager and resident engineer, Mr. Tebbett, courteously explained each object of interest. In the Board-room a *déjeûner à la fourchette* was provided by Mr. Ellis for the party, and Mr. Pritchard, as hon. sec. to the district, was requested to convey the thanks of the Association to that gentleman for his kindness. The Association also expressed their indebtedness to Mr. Tebbett. Not only were the water-works open to inspection, but copies of the plans were placed for inspection by Mr. T. Hawksley. Mr. Hawksley had wished that the Association had deferred visiting Bradgate till the summer time; then they would have seen, not only the works, but the grounds, which are tastefully laid out, to greater advantage. The party then proceeded to

The Sewage Works.

Mr. Stephens, the borough surveyor of Leicester, took great pains to carefully explain all matters connected with the works, which, as our readers no doubt are well aware, were about the first of the kind constructed. They are by Mr. Wicksteed, and have been frequently pointed to as being one of the best illustrations of purification of sewage by lime. The town-hall was again reached about five o'clock, when the president, Mr. Lewis Angell, said he had prepared a paper having especial reference to the legislative aspect of the sewage question, and the failure of chemical systems, but he preferred deferring the reading of his paper till the annual meeting, at Birmingham, in May, in order that the meeting might hear the paper to be read by Mr. Stephens, explaining more fully the interesting works they had just left. To this suggestion the meeting agreed, and the President added that he would issue a small draft of his paper to the Association prior to the Birmingham meeting, in order that they might be the better able to discuss it.

Mr. Stephens then read his paper. He stated that the sewage-works were situated about a mile from the town, and the site contained an area of about four acres; that at these works the whole of the sewage of the borough, amounting, with a quantity of subsoil-water, to an average of five million gallons per day, were raised by two single-acting Cornish pumping-engines, each of twenty-horse power, to a height of 20 ft. These Cornish engines were so constructed that at each stroke of the pumps they mixed with the sewage-water certain portions of cream of lime, the effect of which was a rapid and perfect precipitation of all matters in suspension. The lime was slaked in pits with sluices; and this being thoroughly effected, it passed into circular tanks, and in these agitators were formed, which, constantly rotating, prevented deposits. It then passed through suction-pipes to the pumps, which are attached to the beams of the engines, and is raised and mixed with the sewage in its course to the settling-tanks. The sewage subsequently passes into pits in which other agitators are kept in constant motion by an engine, for the purpose of more intimately mixing the lime with the sewage. From thence it passes through checkered walls into the settling-tanks. After a description of these tanks, it was shown that by the process thus explained something like 4,000 tons of solid matter were obtained per annum.

In reply to questions, Mr. Stephens said it took nearly two years to dry a tankful of manure, and that, in connexion with the Leicester sewage-works, they had about two acres of tanks. The working expenses were about 1,800*l*. or 2,000*l*. per annum, and there was a dead loss in connexion with the works of between 1,400*l*. and 1,500*l*. annually.

The meeting then terminated.

The Dinner,

which took place subsequently, at the Bell Inn, was a very satisfactory one. Mr. Angell presided, and Mr. Lemon occupied the vice-chair. The Mayor of Leicester (Mr. W. Kempson), and Councillors Green and Millican were also present. The cloth being removed, the toast of "The Queen" was loyally drunk, and the chairman said, there is one toast that upon this occasion I feel bound to propose, and that is the "Municipal Corporations" of this country. Local government is not only the glory of our land, but it is the bulwark of our liberties. We, the municipal engineers of England, are most desirous of assisting municipal institutions so far as we can in our offices respecting sanitary matters. I am sure they most thoroughly approve of our efforts, and particularly when, as upon this occasion, we are honoured with the presence of the Mayor of Leicester. Therefore, I propose the "Municipal Corporations" of this country, coupling with the toast the name of the Mayor of Leicester.

The Mayor made a suitable response. He spoke of the importance of engineering to this country, and the important position which surveyors and sanitary engineers held. He added that he would much rather hear what those present had to say than talk himself.

The Chairman, in giving the toast of the evening, said, the next toast which I have to propose, is success to the Association of Municipal and Sanitary Engineers and Surveyors. Considering our number in this country, and the importance of our appointments, it is a matter of surprise to me that we have not been united before. But now that we are associated together, I think we have every reason to be satisfied with the amount of success which has attended our proceedings. I think our success is greatly due to the energy of our local secretaries, and as we are meeting in the Midland district, I cannot fail to remark that this district has been most energetically promoted by our indefatigable secretary, Mr. Pritchard, of Warwick. He has promoted it on every possible occasion. He has adopted the same idea that I have always tried to urge, and that is, that the success of our Association depends entirely upon the activity of our district committees, our subdivisions, so to speak, of the Association. They alone will keep alive our Association throughout the country. I am sure the Midland district gives us a pattern of energy which may be copied by all other parts of the country. In speaking of district associations, I will also refer to our friend, Mr. Vawser, who is honorary secretary for the Lancashire and Cheshire districts, and has very much promoted the success of this Association; but as we are met in the Midland district, I desire to give you the name of our local secretary, Mr. Pritchard.

Mr. Pritchard and Mr. Vawser suitably responded, the latter gentleman proposing the health of the president, which was suitably acknowledged.

The remaining toasts were,—"The Vice-presidents and Officers," responded to by Mr. Jones (Ealing); "The Visitors," acknowledged by Councillor Green (Leicester); "The Health of Mr. E. L. Stephens" (borough surveyor), which he suitably acknowledged; and "The Press," responded to by Mr. H. J. Hodson (Coventry).

ARCHITECTS' BENEVOLENT SOCIETY.

THE annual general meeting took place at the Rooms of the Royal Institute of British Architects on Wednesday, the 11th instant, the President, Mr. Sydney Smirke, R.A., occupying the chair.

The business of the meeting was of a routine character, amongst which was the election of a new treasurer in the room of Sir William Tite, C.B., deceased. On the motion of Mr. Papworth, which was seconded by Mr. J. A. Hanson, Mr. George J. J. Mair, F.S.A., was elected. Mr. Mair is one of the seven gentlemen who met on the 31st October, 1845, and then laid the foundation of this society; two others now only remain, Mr. J. H. Hakewill and the Hon. Secretary, Mr. John Turner. The President spoke very gracefully of the untiring zeal in the cause of the society always manifested by the newly-elected Treasurer, who suitably returned thanks, and gave a donation to the funds as an earnest of the continuance of his good wishes of 20*l*., in addition to the sum he has already given.

The report this year took the shape of an appeal to the profession at large to come forward and help the good work the council had in hand by increasing their means. In conclusion it said:—

"The council have to report generally, that the financial state of the Society is very satisfactory. Through the great liberality of the Duke of Westminster, Mr. Akroyd, M.P., and various members, who have added donations to a considerable amount, our balance in hand last January exceeded that of previous years, although a larger sum has been devoted to charitable purposes than we have hitherto ventured to appropriate. We regret that five deaths of members have occurred through the past year, but eight new members have joined us. It is an agreeable fact to record that several of our members have, during the year, doubled their subscription; and, as a significant mark of the estimation in which the Society is held, we would add that a bequest of 20*l*. has been recently made by our late distinguished member, Mr. Teulon."

From the auditors' balance-sheet it appeared the receipts of the past year were 477*l*. 17*s*. 1*d*.; the expenses attendant upon advertising and management, 88*l*. 2*s*. 4*d*.; the stock invested was 114*l*. 0*s*. 6*d*.; the gifts to applicants amounted to 235*l*.; and the balance carried forward was 173*l*. 5*s*. 2*d*.

Since the meeting of the council on the 26th of February, the hon. secretary announced, he had received the following donation—Charles Forster Hayward, 1*l*.; also further donations to amount already given,—Arthur Cates, 10*l*. 10*s*.; David Brandon, 5*l*.; John J. Phéné, 5*l*.; and J. A. Hanson, 2*l*.; also that Mrs. E. C. Hakewill desired to increase the amount of her annual subscription from 1*l*. 1*s*. to 2*l*. 2*s*.; as also did E. M. Barry, R.A. He also announced that the proprietors of the *Builder* had intimated their intention of annually subscribing to the funds, and that H. A. Freeman and Charles Fisher were new subscribers each of 1*l*. 1*s*.

The meeting closed with votes of thanks to the donors to the Society, and to the president, hon. secretary, &c. Members present were—Messrs. Benjamin Ferrey, Horace Jones, J. H. Hakewill, J. A. Hanson, George J. J. Mair, Edwin Nash, Wyatt Papworth, Sydney Smirke, J. Goldicutt Turner, and John Turner, the hon. secretary.

LIGHTHOUSE, CEYLON.

THE INSTITUTION OF CIVIL ENGINEERS.

ON Tuesday, March 3, the first paper read was "On the Great Basses Lighthouse, Ceylon," by Mr. William Douglass, C.E.

As early as November, 1826, the late Sir J. J. Gordon Bremer, R.N., and the late Capt. W. F. Dawson, R.E., made an examination of the south and east coasts of Ceylon, one of the results of which was the recommendation for the erection of a beacon on the Great Basses. It was not until 1855, however, that the authorities gave instructions for the preparation of a design for the work. This design, submitted by the late Mr. Alexander Gordon, C.E., was for a cylindrical cast-iron tower, secured within an enlarged basement of masonry, which basement was to be inclosed within an outer casing of cast iron, and both tower and casing were to be sunk into the rock. Mr. Gordon's estimate for the work amounted to 33,946*l*., and that sum having been sanctioned by the Board of Trade, Mr. W. W Poingdestre was appointed the resident engineer, and left England for Ceylon in March, 1856. After three years' operations and the expenditure of about 40,000*l*., only a few landings had been effected on the rock, and the authorities therefore suspended further proceedings.

In June, 1867, the whole question, as to the practicability, probable cost, and reasonable chance of success of the erection of a lighthouse on the Great Basses, was referred to the Elder Brethren of Trinity House, who recommended for approval a design prepared by their engineer, Mr. J. N. Douglass, C.E. That design was for a granite structure, in which the base of the "Gordon" lighthouse was proposed to be utilised. The plan further included a lantern and dioptric revolving apparatus of the first order; also a light vessel, to be moored off the rock, for exhibiting a red revolving light every night during the progress of the work, and to serve as a barrack for the executive engineer and staff. The total estimated cost of the work was 64,661*l*. The design having been approved by the Board of Trade, and the Trinity House having agreed to undertake its execution, the necessary funds were voted by Parliament, and the work was immediately proceeded with. The author, who was then building the Wolf Rock Lighthouse, was appointed the executive engineer. The lighthouse consisted of a cylindrical base, 30 ft. in height and 32 ft. in diameter, on which was placed a tower, 67 ft. 5 in. in height, 23 ft. in diameter at the base, and 17 ft. in diameter at the springing of the curve of the cavetto. The thickness of the wall was, at the base of the tower, 5 ft., and at the top 2 ft. The accommodation within consisted of six circular rooms, each 13 ft. in diameter. There was also a room 12 ft. diameter in the basement, for coals and water, and a rain-water tank below 7 ft. 6 in. in diameter. From the floor of the tank to the rock, a depth of 11 ft. 6 in., the building was solid. The tower contained 12,288 cubic feet of granite, and the cylindrical base 25,077 cubic feet, making a total of 37,365 cubic feet, weighing about 2,768 tons. The stones forming the wall of the tower were dovetailed, both horizontally and vertically. Medina cement was used for the first and second courses, and Portland cement for the courses above these. The cylindrical 14 ft. lantern of the Trinity House was adopted. The dioptric apparatus had eight panels of refractors, with upper and lower

prisms, for emitting flashes of red light at intervals of 45 seconds. A 5-cwt. bell, for a signal during foggy weather, was fixed on the lantern gallery.

The light was exhibited on the 10th of March, 1873, and had since been continued with regularity every night, from sunset to sunrise. The illuminant adopted was Ceylon cocoa-nut oil, at a price of about 2s. 3d. per gallon. The work was executed without loss of life or of limb to any person employed. The total cost of the undertaking was 64,300*l.*, being 361*l.* below the original estimate.

THE BONE CAVES OF THE WYE, AND ANCIENT TROPICAL AND ARCTIC LIFE.

AT the Worcestershire Natural History Society's Rooms, Worcester, Mr. G. W. Hastings, president of the Society, recently gave an account of the bone caves discovered on the banks of the river Wye, near Symond's Yat, in Herefordshire. He, in company with Dr. Carpenter and the Rev. W. Symonds, F.G.S., had visited the locality and made some curious discoveries. Only three caves out of twenty had at present been investigated. In clearing out the rubbish on the upper surface of one, they found two human skeletons and coins and ornaments of the Roman-British period. They then came to a floor of solid stalagmite, so thick and hard that it had to be blown up with gunpowder. Below the stalagmite was another layer, and in it the bones of the common black bear, and nothing else. At the bottom of this layer was a second bed of stalagmite, 2 ft. thick, which they also blew up with powder, and beneath this they found an immense mass of fossilized bones of extinct animals, the remains of a mammoth in a marvellous state of preservation, and the bones of the woolly rhinoceros, the cave lion, cave bear, and hyena. A flint weapon, as Dr. Carpenter held it to be, was found among the extinct animals. Mr. Hastings then diverged to the subject of the antiquity of man, which he was of opinion dated further back than was generally admitted; and, in incidentally referring to the evidences found in this country and in more northern latitudes of it having at some time grown tropical plants, he started a theory that the axis of the earth had been slowly altered, and hence the change of temperature, &c.

An approximation is thus being made to the simpler and more natural view taken in the *Builder*, according to which *causes still in operation* suffice to account for all the phenomena, including *both the tropical and the arctic*, without any supposed former change of axis in the earth at all. The secular diminution of the angle between the ecliptic and the equator is a cause still in operation, and which has been going on in past ages, and for a period not only utterly unknown, but admittedly without sufficient astronomical data for the small limits to it yet allowed by astronomers, who must now allow geological records to aid and instruct them as to its real extent. According to this view the present *arctic* winters and summers are merely the close of a vast period, during which tropical summers must have alternated with arctic winters in this and other countries, the sun going further north in the summers, and returning further south in the winters, so that both arctic and tropical phenomena must have prevailed by turns, just as milder summers and winters now do. Thus, and only thus, can apparently anomalous and contradictory facts in respect to the former existence of arctic and of tropical life in the caves and the strata of this and other countries be explained and reconciled.

A DISASTER AT THE EAST LONDON RAILWAY WORKS.

A CASUALTY has happened at the works of the East London Railway under the London Docks now in progress, which has caused some inconvenience and danger at the workhouse of St. George's-in-the-East. The railway works closely skirt the workhouse which the railway company are underpinning, and it appears that in consequence of the giving way of a portion of the piling in the docks the works have been flooded with water, and that although the shafts sunk for the purpose of underpinning the workhouse are at some distance from the flooded part of the railway works, the water has penetrated through, and is now within a few feet of the old footings of the workhouse. The consequence is that it has now become necessary to complete the work under the workhouse in Portland cement, which will have to be laid by a diver, as it is impossible to pump the water out until the main works of the railway are clear. This course the railway company are now pursuing in underpinning the workhouse walls.

PROPOSED IMPROVED THOROUGHFARES BETWEEN CLAPHAM COMMON AND THE WEST END.

A PROJECT has just been mooted for improving the communication between Clapham Common and the surrounding neighbourhood of South London, and Kensington and the West End. It is urged that although the distance between the neighbourhood of South Kensington and that of Clapham Common is comparatively short, yet that the means of access between the two districts is difficult and circuitous in consequence of an absence of direct connecting thoroughfares, and that the new Albert Bridge, which crosses the Thames at the bottom of Oakley-street, Chelsea, and terminates at the western corner of Battersea Park, is of small utility for general traffic purposes, in consequence of there not being good thoroughfares leading to it either on the one side of the river or the other. It is admitted that there is a good road from Clapham-common to Wandsworth-road, which will be still further improved when a new street now in course of construction from Wandsworth-road to Queen's-road is made; and in order to complete the communication on the south side it is suggested that this new street should be continued from Queen's-road across the waste ground lying by Battersea Park, to the south-western gate of the park, where it would meet the present road to Albert Bridge, and so complete the communication across the Thames to Chelsea. With the view of continuing the proposed improved thoroughfare after passing along Oakley-street to the King's-road, the suggestion is that the houses on the west side of Arthur-street, which are generally small dwellings, and many of them in a dilapidated and ruinous state, should be taken down for the purpose of straightening the line and widening the street, so as to make its western side run in one line with the western side of Charles-street, Fulham-road. It is further proposed that about fifteen houses should also be taken down on the eastern side of Charles-street, in order that the east side of this street could be brought into line with the east side of Arthur-street, the result being that a wide and convenient new thoroughfare would be opened between the King's-road and the Fulham-road. This thoroughfare could then be continued along the west side of Onslow-square, opening out into the Cromwell-road. The result would be a wide and direct thoroughfare from Clapham-common and South London to South Kensington, the Albert Hall, the parks, and the West End generally. It is urged in favour of these proposed improvements that at the present time the property which would have to be purchased for carrying them out is comparatively of small value, whilst the advantages would be great, in addition to the property along the route increasing in value in consequence of the improvements being carried out.

MEMORIALS.

Scarth Memorial Hall, Barnard Castle.—At a meeting of the committee held at the offices of Messrs. Watson, Barnard Castle, the plans of the architects (Messrs. Ross & Lamb, of Darlington) were submitted and approved. The estimated cost of the memorial hall is 1,000*l.*, the greater part of which is already in the hands of the treasurer.

Sedgwick Memorial, Cambridge.—At a meeting of the Sedgwick Memorial Committee, held at Cambridge, Professor Humphry in the chair, it was stated by the treasurer that the subscriptions exceeded 10,000*l.*, and that more than 7,000*l.* had been paid to the account of the fund at the several banks. The question of the site of the new Geological Museum, which is to constitute the memorial, was discussed, and the feeling of the committee was in favour of the space in front of the new museum in Pembroke-street.

Memorial of Dean Garnier, Winchester.—The shape this will take has now, we believe, been finally decided on by the committee. Their proposition is to erect a fine open carved oak screen in place of the one of stone which now encloses the choir from the nave of the Cathedral. By a photograph taken by Mr. Savage of the drawing made by Sir Gilbert Scott, it appears that the new screen will to a great extent make use of the carved arched canopies now behind the stonework, and the whole erection will be in unison with the carved work of the stalls. The cost of the memorial will be about 1,500*l.*, and the committee have now about 800*l.* subscriptions promised. The idea once entertained of refilling the great west widow is now abandoned, for this which we have just given. At the meeting of the committee, Sir Gilbert Scott, in submitting his design, said in placing it on paper he was surprised at the great beauty and unique effect produced by simply converting the existing Gothic stall work into an open screen, and providing a nearly similar front to face the nave. Archdeacon Jacob at once stated he would increase his original subscription of 10*l.* to 25*l.* if the new design were adopted and carried out, and other subscribers would no doubt act in the same spirit. The architect's drawings will be placed in the Guildhall for inspection.

COTTAGE HOSPITALS.

Shaftesbury.—A new cottage hospital, erected by subscription in memory of the late Marquis of Westminster, has been opened at Shaftesbury by the Bishop of Salisbury, in the presence of a numerous company. It is a picturesque building, erected at a point which commands an extensive view of the Vale of Blackmoor. The site was given by the Dowager Marchioness of Westminster, and the cost of the building has been about 2,000*l.*

Newmarket.—Meetings for the purpose of taking into consideration the necessity of establishing a cottage hospital for Newmarket and district have been held. Mr. Fenn alluded to the hospital at Royston, for which Lord Dacre gave the site, and a lady 200*l.*, the necessary funds being quickly raised by twelve or fourteen subscribers, and there all the medical men were in favour of it. A committee was formed to carry out the object of the meeting.

HIGH AND LOW ROOMS UNDER FIRE.

SIR,—Permit me to point out a distinction which generally escapes the notice of those who confide in the efficacy of so-called fireproof modes of construction.

Suppose a warehouse, constructed with floors so close together that the spaces between are like the accommodation for passengers in a slave-ship, or for the crew of a coasting barge,—3 ft., 4 ft., or 5 ft. high; and again, suppose another warehouse, to have a height between the floors of 20 ft.; and suppose that both warehouses are filled with goods and furniture, in that one with the lofty spaces the articles being stacked and piled up, to save space. Now, consider the different circumstances attending an outburst of fire in the two cases. A chimney, 20 ft. high, has, let us suppose, a draught up it of four times the vehemence of that in a flue only 5 ft. high. In the warehouse with lofty stories, on every square yard of floor there are four times the quantity of fuel than there is in a yard of the low space. Suppose, then, that the quantity of combustible matter is multiplied by the vehemence of draught, it would seem that the ceiling of the lofty space is attacked by a force of fire sixteen times as great as that which attacks the ceiling of the low space. If so, it would seem that the allegation of fireproof constructibn, made with reference to the low-spaced warehouse might be a safe and reliable one, whereas a precisely similar mode of construction adopted for the lofty warehouse would be a delusion and a snare to those who placed faith in it as a security from fire. Only admit that a warehouse story is indefinitely lofty and indefinitely utilised, by stacking up inflammable goods within it, and it would seem that not even the thickest armour plating for a turret ship would constitute a fireproof ceiling.

G. M.

The late Mr. John Roe, Engineer.—We hear with regret of the decease of Mr. John Roe, formerly Surveyor to the Holborn Sewers, and also Chief Engineer to the Metropolitan Commissioners of Sewers. Mr. Roe died at his residence on the 15th, aged seventy-nine years, and will be interred at Finchley Cemetery at 2.30 p.m. on this Friday, March 20th.

OUR KNOWLEDGE OF HYDRAULICS.

SIR,—It is always desirable that any novel statements on matters of science should be thoroughly thrashed out by intelligent discussion.

I think, therefore, that we are indebted to your correspondent, Mr. J. K. Mann, for the defence which he volunteers of our actual knowledge of hydraulics.

But he seems to me to miss the point raised by the observations of M. Révy. Mr. Mann speaks of surface current. As to this nothing has been alleged in the "Hydraulics of Great Rivers" which is inconsistent with the ordinary views. M. Révy has expressed the opinion that, considering the minute differences of level that give rise to varying velocity, it is more reliable to calculate gradient from measured velocity, than to estimate velocity by levelled fall. But this in no way interferes with the operation of that well-known law which is at the bottom of all the formulæ.

I cannot be sure to which of M. Révy's observations Mr. Mann refers as to the La Plata velocity. If it is to those figures which are given in a table on page 45, they will repay careful study; and it will be of interest to work out the volumes of mean flow which they give as compared with those arrived at by the usual formulæ. When it is observed that, according to actual measurement, we find a surface-current of 108 ft. per minute, giving a mean current of 71·50, and a surface-current of 116·75 ft. per minute, giving a mean current of 83·53, it seems pretty clear that we must, for the future, be guided rather by actual survey than by the use of formulæ which are confessedly empirical.

F. R. C.

BRIDGES AND CULVERTS.

SIR,—Turnpike trusts are frequently expiring in different parts of the country, and the expiring Turnpike Act states, "Where a turnpike-road shall have become an ordinary highway, all bridges which were previously repaired by the trustees of such turnpike-road shall become county bridges, and shall be kept in repair accordingly."

As there are a great many small arches, culverts, and drains, which cross the roads, it has become a question whether the whole of them are included in the term "bridge," and if not, where would the culvert end and the bridge begin?

As this is a subject of considerable public importance, perhaps you will be good enough to find room for these few lines in the *Builder*, in the hope that some of your correspondents may be good enough to give opinions or experience on the subject. COUNTY SURVEYOR.

BOARD OF WORKS AND THE CONTRACT SYSTEM.

SIR,—Seeing in the *Builder* of last week that one parish south of London has decided to endeavour to alter the present system upon which the parish works have been done, allow me to say this must afford great satisfaction to a large portion of the heavily-taxed ratepayers of the metropolis; for, since the great contract scandal of the Wandsworth District Board of Works was discussed, in which the surveyor was charged with taking a uniform commission of 5 per cent. on all works executed by the contractor (*vide Wandsworth District Times*, Oct. 18, 1873), people are beginning to inquire if it is done elsewhere. When we consider the many thousands of pounds' work yearly carried out, such a commission would represent a very large amount thrown upon the ratepayers.

JUSTICE.

ACTION BY A BUILDER FOR LIBEL.

MR. JOHN PETHIC, a builder, contracted for the new Guildhall at Plymouth, and signed a contract for 32,475*l*. During the progress of the works a letter appeared in the *Western Daily Mercury*, published at Plymouth, complaining of the way in which it was being done. This was the libel complained of. The plaintiff, Mr. Pethic, alleged that it was probably written by a rival builder. Defendant said the letter had got admission to the columns of the paper surreptitiously, without the knowledge of either the editor or the sub-editor, and the copy had been made away with. He apologised, however, in the same paper, for its publication. On the other hand, the plaintiff declined to accept of the apology as being sufficient. He said he was a loser to the extent of more than 1,000*l*., from a forced rise in wages and otherwise, in consequence. The jury appeared to think that defendant had done sufficient to redeem the error into which he had fallen (so long ago as about four years since), and returned a verdict for defendant.

ACCIDENT ON THE ROAD.

AT the Worcester Lent Assizes, in the Nisi Prius Court, before Mr. Baron Cleasby, an action was brought by Mrs. Sarah Letts against the Oldbury Local Board of Health.

The plaintiff sought to recover damages for loss sustained by her by the death of her husband, who was killed, it was alleged, owing to the negligence of the defendants in not keeping a road under their supervision in proper repair. The damages were laid at 5,000*l*.

The case, as set forth, was this:—The deceased, Mr. W. Letts, was going along the Birchfield-road, when the wheels of his cart came in contact with a heap of cinders (Rowley rag, for a wall), which had been placed on the side of the road, and extended, it was said, about 3 ft. into the road. The result was, that Mr. Letts was thrown from his cart, and died very soon afterwards. The question for the jury was to consider who was to blame, and the amount of damages Mrs. Letts was entitled to. After evidence for the plaintiff and defendants was heard, the jury returned a verdict for the defendants.

THE BUILDERS' CLERKS' INSTITUTION.

SIR,—With reference to your report of the annual meeting of the Builders' Clerks' Institution, permit me the opportunity to establish, if only as a reference, my protest against Rule 14 being violated, whereby the orphan fund, now reaching between 500*l*. and 600*l*., is at once to be used in lieu of waiting till it reached 1,000*l*.

Had the scheme originated with a subscriber to that fund, or even less, from a member who had not aided to compile the rules or subscribed his name thereto, I should not have been surprised at the desire to alter them. The meeting was small, and did not by any means show the feeling of the subscribers, considering that most of those voting did not subscribe to the fund they proposed to use.

I confess my inability now to work for the Institute so hard as in the time when I first sought and received your countenance and support. Time I cannot spare, and have therefore but one alternative,—to crave a space in the columns of that journal which so much aided me in 1866, and which has brought masters and clerks and sympathising public together, and with it a collection close upon 300*l*., great portion of which was to that fund now alluded to in the present scheme. Its disbursement is to be considered. To those who, as above, so liberally responded to my views I express them now,—"that the time is not more pressing now than then, and that there is no real sound reason for departing from our original intention, and that I beg the subscribers who favoured me in years gone by, will not now hesitate to endorse my protest."

THOS. PETO WARD.

DISPUTED CONTRACT.

THE Vicar of Dartmouth and his builder have been at loggerheads about a contract for work done in St. Saviour's Church, Dartmouth. The claim was for 73*l*. 8*s*. 8*d*., for work and labour done in respect of certain alterations in the interior of the church. It was a case with rather peculiar features, and somewhat complicated. The plaintiff, William Crocker, was a builder in Torquay, and the defendant, the Rev. J. Priestly Foster.

The plaintiff contracted with the defendant for the work done, by "a fictitious tender," in such a way as to conceal the true nature of it from other persons, with whom the vicar was at variance, but into the peculiarities of the case we cannot enter. The special purpose of the defendant was stated for the plaintiff to be to bring the choir from the gallery to the chancel, and put temporary seats for the choir in the aldermen's pews. Plaintiff admitted that he was in hot water, or "rows," with the corporation and other parishioners, but he had the permission of the Bishop to do the work. The upshot of the whole affair was, the jury has returned a verdict for the defendant, and the plaintiff declared that the defendant had got 113*l*.'s worth of work for 40*l*. The "fictitious tender" to which the plaintiff had agreed, as a private acquaintance of the defendant, was for 28*l*. 10*s*.

ARCHITECTS' ACTIONS.

PUGIN *v.* MOLLOY.

SIR,—The report of this case in your publication of the 28th ult. is incorrect in material parts, affecting the interests of my client, the defendant, the Rev. William Molloy. For instance, the name of the Bishop of Birmingham, to whom the matter was stated to have been referred, was not even mentioned at the trial, and Mr. Hopwood, for the defendant, did not state that he depended for his defence upon a point of law; nor did the Judge rule that the plaintiff had a just and valid claim for the difference between the actual specification, or quantities, and the amount of work which had been executed; nor did he give a verdict for the plaintiff, which carried the costs of the cause; nor was any offer of compromise made. In fact, you have been completely misinformed. The cause, and all matters in difference, were simply referred to arbitration; the parties are, therefore, in reference to this action, in exactly the same position they occupied before it was called on for hearing. ARTHUR C. RYAN,

Lincoln's-inn-fields. Defendant's Attorney.

*** The notice (p. 181, *ante*) came to us in the shape of a printed slip from one of the parties concerned, as we made known by a foot-note at the time.

BOARD SCHOOLS.

High Wycombe.—New Board Schools are in progress to accommodate 1,000 children, the buildings including covered playgrounds, committee-rooms, teachers' residence, &c. The materials are of black and red brick, with stone dressings, and are slated. The new selenitic mortar is used. The total cost (exclusive of ground) is expected to be about 7,000*l*. Mr. W. R. Loosley, of High Wycombe, is the contractor, and Mr. Arthur Vernon the architect.

TO RENDER WOOD INCOMBUSTIBLE.

SIR,—Will any of your numerous readers inform me of the best process for rendering wood used for building purposes uninflammable; or, at all events, calculated to delay combustion? D. B.

*** We cannot undertake to print the replies we may receive to this inquiry, but, at any rate, they shall be forwarded to the querist.

COMPETITION.

Whipstead, near Bury St. Edmund's.—The plans sent in to the School Board, by Mr. Frank Whitmore, architect, Chelmsford, have been selected, and the works are to be commenced immediately.

THE ROCHDALE TUB SYSTEM.

SIR,—In concluding your notice of the "explanation" of the Rochdale system, by Mr. T. Hewson, borough surveyor, and Mr. J. Haresceugh, manager, you say "our own opinion of the system is anything but favourable."

I think, sir, if you were compelled to use a closet on the "Rochdale system," as so many are in this town, your "anything but favourable opinion" would in no degree be modified.

How any sanitary authority out of Rochdale has been induced to adopt the system is to me incomprehensible. But that any medical man connected with the Health Office of the Privy Council should have sanctioned the use of a plan of collection so repulsive, is literally astounding. As to Rochdale, I fearlessly assert that had it been recommended by any other person than Mr. Alderman Taylor, the present chairman of the Health Committee, it would have been rejected with disgust.

This so-called "Rochdale system" was first introduced here in the early part of the year 1869, as Haresceugh's box-and-ash system, oblong boxes being used as the receptacles, with a small quantity of dry ashes and deodorising powder placed at the bottom, to modify the sloppiness, and prevent smell. The system had been previously tried at Leeds by Mr. Haresceugh, in connexion with a Dr. Bishop, and proved a disastrous failure.

The preliminary trial in Rochdale commenced in February, 1869, and was carried on until September, under the nominal supervision of a sub-committee, of which Mr. Alderman Taylor was chairman. On the report of this committee, drawn up by the chairman, recommending Haresceugh's system, it was finally adopted at the September council meeting. I have drawn these data from a file of the *Rochdale Observer* for 1869.

Oddly enough, the system thus introduced to the ratepayers of Rochdale as Haresceugh's, and recommended for adoption by Mr. Alderman Taylor, was subsequently patented by that gentleman. The patent is No. 1969, dated 1871.

A RESIDENT.

CHURCH-BUILDING NEWS.

Bath.—The new church of St. Paul, for the residents of a new ecclesiastical district formed out of the parishes of Trinity and St. James, has been consecrated by the Bishop of the Diocese. It occupies the site of the old Elephant and Castle Inn, which faced the Upper Bristol-road, and stood at the angle now occupied by the nave of the new church. The new edifice is in the Early English style, is built of local stone, and consists of a nave, 97 ft. long, terminated by a circular apse. The width is 38 ft., and the height to the ridge of the roof is 50 ft. Ultimately it will have a western aisle, which will be separated from the nave by arches already erected, and supported by circular Pennant columns. At the present time a space of some 4 ft. wide beyond the arches is covered in and bounded by a temporary wall, pierced with lancet windows. On this wall have been placed the mural tablets removed from St. Mary's Chapel. The other interior walls are faced with clean-worked ashlar, having red mortar pointings, and relieved with bands of red stone from the Bishop Lydeard quarries. The roof is wagon-headed, supported by hoffer-trusses, carved and moulded, and supported on ornamental stone corbels. It is diagonally boarded, and covered with Bangor slating. The passages, choir, and sanctuary are laid with encaustic tiles, supplied by Mr. Godwin, of Hereford; and the windows are filled with grisaille glass, from Messrs. Heaton, Butler, & Bayne, of London. Externally, the building

presents five buttressed bays on the Chapel-row side, with a two-light window in each; and a gable at the south or Upper Bristol-road end, 63 ft. 6 in. high to the top of the cross. In this southern end is a central doorway, approached by a double flight of steps, and surmounted by five lancet windows, over which is a rose-window. The lancet windows are relieved with red stone columns, as are also the five lancet windows in the chancel. The whole of the exterior is of hand-dressed freestone. Besides the principal or western door, there is an entrance at the north-east angle of Chapel-row. There is also a small door in Stable-lane, giving direct access to the temporary vestry and organ-chamber. The church is seated with 700 rush-bottomed chairs, arranged for kneeling, with ledges for books, and kneeling-mats are also provided. The gas-lighting is effected by bracket lights on the eastern side, and rows of jets round the capitals of the columns on the western side. These fittings and other smiths' work have been supplied by Messrs. Saunders & Ellett. The choir and sanctuary are lighted by a large brass corona, manufactured by Messrs. Witham. The works have been carried out from the designs of Messrs. Wilson, Willcox, & Wilson, of Bath, by Mr. Joseph Bladwell. The carving is by Mr. Watts, and the heating and ventilating apparatus by Mr. S. Diplock, of Bath and Trowbridge.

Leicester.—St. Nicholas's Church has been re-opened, after having undergone considerable repair and alteration. The church had for some time past been in a very dilapidated condition, and extensive repairs have been made in supporting the weak points of the building, in renewing the decayed portions, and in putting the church generally in such a condition as will secure it from further decay. The old pews have been replaced by free and open seats. The entire floor has been relaid, and tiles placed in the chancel. A new Mansfield baptismal font, with alabaster pillars, has been placed in the church, while a stained glass window, a representation of the Crucifixion, has been placed in the east end, over the altar. The window is the gift of the vicar. Messrs. Ordish & Traylan were the architects, and Mr. Osborne the builder. Much yet remains to be done, and as the total cost is expected to be about 12,000*l.*, it is hoped that the friends of the church will contribute liberally towards the object in view.

Daventry.—The Rev. Chancellor Wales presided in the Consistory Court at All Saints' Church, Northampton, to hear an application from certain parishioners of Daventry with respect to the reseating of the parish church. In the early part of August last, the Rev. John Martyn Collyns, rector, Captain E. Stopford, R.N., churchwarden, and others, petitioned this court for a faculty to be allowed to make certain alterations in the church. Messrs. Burton and Willoughby, and other parishioners, then opposed the application, and the court adjourned in order that the parties cited might file their plaints. At the second meeting Messrs. Burton and Willoughby withdrew their opposition, in consequence of the Rev. J. M. Collyns having acceded to a request to make the height of the new seats 3 ft., and at a later period the other parishioners also withdrew. The Chancellor therefore decreed that the faculty should issue according to the petition. It was now thought that the whole affair had come to a satisfactory termination, and the work of alteration was proceeded with. Immediately, however, that the reseating was commenced, it was discovered that, instead of 3 ft., according to the agreement entered into with Mr. Burton, the height of the seats was 2 ft. 10 in. only. Notice of this was given to the parishioners in order that they might carry out the agreement; but the reseating went on, and the result was that these proceedings were instituted by the parishioners. In the course of the proceedings, however, an agreement, said to be satisfactory, was again entered into, the seats to be 3 ft. in height, as before arranged.

Thirsk.—It is proposed to restore the church. Some time ago Mr. Street was engaged by the committee to prepare plans. He estimates the restoration to cost 4,600*l.*

New Offices for Westminster. — At the last meeting of the Westminster Board of Works, the Hon. Ashley Ponsonby gave notice that he would move at the next meeting that the Board do take into consideration the necessity of providing new parochial offices for the use of the Board and the vestry, the present offices being most unsuitable.

Books Received.

The Design and Construction of Harbours: a Treatise on Maritime Engineering. By THOMAS STEVENSON, F.R.S.E., C.E., &c. Second Edition. Edinburgh: Adam and Charles Black. 1874.

IT was to be expected that this standard work, first published in 1864, would reach a second edition. Mr. Stevenson has long been known and esteemed as a most reliable authority in maritime engineering. The work under notice was originally embodied in the Encyclopædia Britannica, as an article on "Harbours"; and it has since been revised, both in the first and second editions of the treatise under notice; and now many additional subjects have been introduced, while most of the chapters have been considerably extended. As a specimen of the new matter, and of the work generally, we may quote a passage on concrete:—

"*Monolithic Structures of Cement, Concrete, or Rubble.*—In *Nature* for September, 1871, I suggested that lighthouses on rocks in the sea might in certain situations be constructed *wholly* of cement rubble. The advantages of this mode, or of gravel concrete, when used not in separate blocks but in *continuous building*, are the following:—1st, the dispensing with all squaring or dressing of materials. 2nd, The suitableness for such works of any stone of hard quality, thus rendering it unnecessary to bring large materials from a distance, or to open quarries for ashlar. 3rd, No powerful machinery is needed, as for moving or raising heavy materials. 4th, Saving in the levelling of the rocks for a foundation for the tower. 5th, The ease of landing on exposed rocks small fragments of stone, as compared with the landing of heavy and finely-dressed materials.

A beacon 13 ft. high and 10 ft. diameter was constructed under Messrs. Stevenson's directions in a very exposed situation near Isle Earraid, Argyleshire, which has stood perfectly for the last two years.

The walls of harbours may also be constructed of continuous building, protected by temporary piling and close planking. The best mode of keeping out the water, as adopted by Mr. Balmer at the Duke of Richmond's harbour of Port Gordon, is to make a saw-draft in each plank, and to place a thin plate of iron between the planks. An example of this continuous or monolithic building is shown in Plate 18." . . . .

"*Asphaltic Masonry and Concrete.*—I have tried, at the island of Inchkeith, some experimental masonry, which is cemented together with British asphalte. At the same time the experiment was successfully tried of letting down under the surface of low water stones and hot asphalte, placed in canvas bags, which were pressed down upon the irregular rocky bottom, so as to equalise it, and render its surface ready for founding on. This substitute for mortar or cement in rubble and ashlar work seems capable of resisting the chemical action of salt water, for at Inchkeith it has stood for several years. Mr. Manley mentions that asphalte was proposed for harbour works in France, but that the risk of its decay prevented its adoption. He does not mention, however, whether any experiments were made in order to test its qualities.

Carbonite Cement.—While the proof-sheets of this book are passing through my hands, my attention has been called by Mr. H. C. Paterson, of Glasgow, to a new material for building and concrete, which plainly presents features of marked interest, the invention of Dr. George Hand Smith, of New York, a prominent American metallurgist. It is the result of a combination mainly of hydrocarbon of varying densities, with clay, chalk, or gypsum, whereby concrete and all kinds of material for building purposes can be produced. The constituents are stated to be cheaper than those at present in use, as well as of a more durable character, being unaffected by frost or exposure, while they resist the action of the most powerful muriatic, sulphuric, and hydrochloric acids. It is further stated that the concrete can be made of any required density. . . . . One of the great recommendations of this cement is the fact of its being fit for use immediately after being manufactured. There is also claimed the further advantage that the blocks are capable of being fixed to each other under water by an indestructible cement of great binding power, which is also prepared in the process of manufacturing the carbonite."

Miscellanea.

Oxford Architectural and Historical Society.—The last excursion of this Society for this term took place on Saturday before last, when a large party of the members and their friends visited the churches of Marston and Headington. At Marston they were welcomed by the Rev. Canon Gordon, who, after a short account of the recent alterations in the churchyard, led the party into the church. Mr. James Parker pointed out the principal features of the architecture. At Headington, the members assembled in the church, where Mr. Parker very briefly pointed out some of the details of the architecture. Attention was called to the curious wall-paintings discovered on the splays of the Early English windows in the south aisle, at the restoration in 1863. These were destroyed at the time, but a drawing of them was published by the Society in their Proceedings, vol. i., p. 302, a copy of which was exhibited and described by the secretary. After inspecting the exterior of the church, and the cross, which stands on the south side of the churchyard, the party returned to Oxford.

The New River Approaches at Liverpool The new approaches to the Mersey, commenced a little over two years ago, are in a forward state, and will be opened for traffic, according to the promise of the Mersey Docks and Harbour Board, within the third year after the commencement of the works. In the construction of the approaches the George's and Seacombe Basins have been absorbed. Their cubic area has been filled with upwards of 200,000 tons of rubbish. Down the centre of the space a "way" has been constructed of granite from the quarries at Freetown, Kirkcudbrightshire, belonging to the Dock Trust. The masonry is of a massive character, and each of the walls is surmounted by a balustrade, in the construction of which Ransome's patent stone, a composition largely in use in America, has been employed. The balustrades are terminated by pillars entwined by a rope carving. On the coping of the balustrades will be placed twenty-four globe lamps. Between the walls an iron bridge, resting on pontoons, will be placed. Its entire length from the termination of the "way" to the Landing-stage will be 590 ft., and its extreme breadth 36 ft. Messrs. Vernon & Capper, of Liverpool, undertook the making of the pontoons for the bridge; and Messrs. Thomas Brassey & Co., of the Canada Works, Birkenhead, those for the junction of the stages: the masonry is being executed by the men in the service of the Dock Board. The scheme, which before completion will have cost upwards of 150,000*l.*, was designed by Mr. G. F. Lyster, the engineer to the Trust, and the operations are being carried out under the direction of Mr. Fielden Sutcliffe.

New Clock and Chimes for Leek Church. The parish church of St. Edward, Leek, now possesses a new chime-clock recently completed. It has been manufactured and erected in the tower by Messrs. Gillett & Bland, of Croydon. It contains all their recent inventions and improvements. The hours are struck upon the tower bell of 20 cwt., the hammer-head being 50½ lb., bringing out the full tone (which, on a still night, may be heard a distance of four miles), and also chimes the St. Mary's (of Cambridge) chimes on four bells every quarter of an hour. The time is shown upon one dial 6 ft. 6 in. in diameter, the figures and minutes being of copper, painted and gilt, glazed with patent opal glass, and illuminated at night by gas. A self-acting gas apparatus is fitted in connection with the clock for the purpose of turning the gas on and off automatically. The motive power is given to the clock by means of weights weighing three-quarters of a ton. The whole of the works are enclosed in a glass case to protect them from dirt. The carillon, or chiming machine, in connexion with the clock, is being also made by Messrs. Gillett & Bland. Only four of these machines have as yet been put up; viz., at Rochdale Town-hall, Bradford Town-hall, Worcester Cathedral, and St. Stephen's Church, Hampstead, London. The Leek carillon-machine is being constructed to play 14 tunes on eight bells. The woodwork was done by Mr. Mackrell; the painting, by Mr. W. Davenport; and the stonework, by Mr. Barlow.

A New Amusement.—Mr. Ruskin is angry at the barbarous state of the country about Hincksey, and has hit upon a plan for beautifying the place. He has long expressed his regret at the amount of time lavished on cricketing, boating, and other fashionable outdoor amusements. These are, he considers, purely selfish modes of gaining exercise. He proposes, therefore, that a band of undergraduates, provided with spades, shovels, pickaxes, and the like, should at once give up their selfish modes of recreation, and proceed to Hincksey, clear the roads, and turn the country into an environ suited to "the loveliest town in England." Fifty or sixty undergraduates have already enrolled themselves in this band, and the professor will, it is said, as soon as his health allows him, join them in their sacred work. Mr. Ruskin will lead them in triumph to the scene of their labours. These will begin at once, in the event of Professor Ruskin being in Oxford; if not, they will be postponed to next term.—*Globe.*

Natural Philosophy in Edinburgh University.—Mrs. Neil Arnott, the widow of Dr. Arnott, has lately written to Dr. Lyon Playfair, offering 1,000*l.* for the promotion of natural philosophy in the Edinburgh University.

Manchester and Salford Ladies' Sanitary Association.—The annual meeting of the subscribers to this association was held at St. Ann's School, Queen-street, to receive the report and statement of accounts. Mr. T. Dale was in the chair. The report stated that the income of the society had been fairly sustained, the slight falling off being caused by the loss, through illness or removal, of several energetic lady collectors. Commencing the year with nine mission women, the number soon increased to eleven, and they had been at work in districts. In nearly all the districts the mission women were permanently placed, two-thirds of their salary being guaranteed. The mothers' meetings had been attended with the best results. The committee regretted to report that there had been more than the usual amount of illness amongst the mission women, and one case of typhoid fever had been peculiarly trying. The committee expressed their sense of the loss the society had sustained in the death of Dr. Turner, who was one of the founders of the society. The treasurer's statement showed that the subscriptions had amounted to 329*l.*, and there was a balance in the bank of 53*l.*

Condition of Sidmouth.—The local Medical Officer of Health, in his first annual report, just published, says:—"The water in the pumps in the town which water I have analysed (presented the analysis to the Board), has been, almost without exception, contaminated with animal matter; I have, therefore, recommended the Local Board to close these pumps, and lay on water. I have called the attention of the Board ever since my appointment, and now I beg to call the serious attention of the Board again to this matter, as I believe it vitally affects the health of the town, and that it is perfectly providential that, with such an insufficient water-supply, there has been no epidemic disease. During the last three months I have, in accordance with the Public Health Act of 1872, visited all parts of the district. I find there is complete ignorance of the most ordinary sanitary precautions,—dung-heaps in close proximity to residences, and this not only in country portions of the district but in the town itself;—pig-sties in the centre of the town; total absence, in some instances, of privy accommodation,—in others the accommodation utterly insufficient." The Board should at once take measures for remedying these evils.

Tinfoil in Wall Hangings. — The Tinfoil Decorative Painting Company (Limited) is being formed, with a capital of 150,000*l.*, in 15,000 shares of 10*l.* each (the list to be closed by the 24th inst.), for the purchase of the stock, plant, machinery, and goodwill of the business lately carried on by Messrs. Daniel & Co., Rue de Rocroy, Paris, in the manufacture of tinfoil decorative painting, together with the patents for the United Kingdom, the United States of America, France, Belgium, and Austria, with power to take new patents for other countries. Decorative wood and marble work is painted on tinfoil, which, when fixed on walls with varnish, is of especial use as a resistant of damp, and a preservative of the work printed on the surface of the tinfoil itself, enabling it, as appears, to last much longer and in better order than when printed on paper. The merits of this invention, however, are very fully set forth in our advertising columns of the 14th of March, and we need not therefore say more here on the subject.

Sale of Shares in the Brighton Aquarium Company.—Two hundred and fifty 10*l.* shares in the Brighton Aquarium Company divided into fifty lots of five shares each, were sold at the Auction Mart recently in less than an hour. The shares were some of those originally issued by the Company, and, being fully paid up, will participate in the issue of new shares now being made. The resources of the institution, Mr. Attree said, had not yet been fully developed, although a handsome dividend had recently been declared. The lots were knocked down at from 10*l.* 10*s.* to 11*l.* 10*s.* per share. The total amount realised by the sale was 2,705*l.*

The Ryde Sewerage Outfalls.—A report has been made to the Town Council of Ryde, upon the outfall sewers, with suggested alterations of the same by the borough surveyor, Mr. G. H. Stayton, C.E. He reports that the outfalls are not in a good state, and that it will be desirable to alter the point of discharge for the whole of the sewage of the borough to as far east of the pier as practicable. He estimates the cost of the proposed works at 4,300*l.*

Val de Travers Asphalte Paving Company.—The annual general meeting of this company has been held at the City Terminus Hotel, Mr. Horatio C. Scott in the chair. The directors' report stated that the year's working had resulted in a profit of 1,646*l.* 0*s.* 10*d.*, notwithstanding that, during the first three months of the year little work was done, and a loss of 1,962*l.* 13*s.* 9*d.* incurred in connexion with works previously contracted for. The directors thought it better to carry the balance forward, instead of declaring a dividend. During the year the material of the company had been exclusively selected by the authorities for all streets of heavy traffic. The directors congratulated the shareholders upon the lapse of time having justified their anticipations of the durability of the asphalte, and that considerable orders had recently been received, and they had reason to expect a continuously-increasing and large trade as the season advanced. The report was adopted.

The Social Science Congress at Norwich. A piece of plate has been presented to the Rev. Canon Hinds Howell, on behalf of the subscribers to the fund for entertaining the National Association for the Promotion of Social Science, in Norwich, last year, in recognition of the services rendered by him as chief local secretary. The testimonial consists of an epergne, standing upon a massive circular plateau. Three camels, wrought in frosted silver, are represented as lying on the plateau, and supporting a fluted column, from near the summit of which spring three branches, which can be used at will to hold lights, or to bear dishes of fruit. A large glass dish crowns the epergne, which is of solid silver, about 2 ft. 6 in. in height, and weighs 160 oz. The description of this memorial, three camels supporting a fluted column, shows that it is about as absurd as such silversmith testimonials usually are.

The Greek Church of St. Nicholas, Cardiff.—The Empress of Russia sent a donation in money, and subsequently a piece of altar-plate, to the authorities of the church at Cardiff for Greek and Slavonian sailors, with the written request "Pray for the rest and peace of the soul of the Emperor Nicholas." On the anniversary of the decease of the late Emperor, a commemoration service, similar to that celebrated last year in Wolverhampton, was performed in the church, notice of which was given to a member of the Imperial Russian court, and a recognition of the same was received by telegraph from St. Petersburg—"Join prayers to-morrow. Sacred vases sent by Greek Consulate." Father Hatherly has received a list of the "Sacred vases," which includes a complete massive set of altar furniture, and a set of priestly vestments, worth at least 200*l.*

The Inhabited House Duty.—According to the Blue-book lately issued there has been a decrease in the house duty of about 20,000*l.*, when in the natural course of things the Commissioners consider there should have been a considerable increase to the extent of the actual decrease. The doubts as to the scope of the exemption of trade premises mentioned in the last report as prevailing with the Commissioners for the City of London might be assigned as a sufficient cause; but, after making the allowance, the Commissioners state that they should have still to account for the sudden arrest of progress in the duty which occurred in 1872-73. Shops and warehouses, beerhouses and farmhouses, are only charged at the rate of 6*d.* in the pound. There is likely to be a revision of the duty. Out of a duty of 1,382,860*l.*, the dwelling-houses paid 1,046,001*l.*

An American Tower of Babel.—Some active American brain has devised a second edition of the tower of Babel. The projector intends the structure to celebrate the Exhibition of 1876 at Philadelphia. The tower is to be 1,000 ft. high. The base is to be 150 ft. in diameter, and the top 30 ft. It is to be constructed of iron plates, connected by girders. Access to the top will be attainable by a hydraulic lift, or by a winding staircase.

The Timber Trade.—It is stated on good authority that there is a great pressure for accommodation for the timber trade in the port of Liverpool. As many as thirty vessels have been ordered to Grimsby, Barrow, and other ports, it is said, where the accommodation is of a very extended character, and given at a cheaper rate. The deal trade is one that is seriously inconvenienced.

New Excavator.—Mr. R. Stone, of Liverpool, has patented an improved pick excavator and discharging elevator for excavating for foundations, surfacing roads, excavating clay, sand, soil, and other like substances. A pick excavator and discharging elevator, according to this invention, consists of a circular disc, or discs, which are carried on a shaft mounted in suitable bearings, carried on a truck or wheeled frame. Carried on the same truck or wheeled framework, and immediately behind the revolving discs, is an elevator, which lifts the loosened material, and discharges the same into a cart, or truck, immediately behind the pick excavator. The picks on the discs are so arranged that they will work at banks or on road surfaces, as may be required. The apparatus is driven by a suitable system of cog-wheels or straps and pulleys.

Rio de Janeiro City Improvements Company.—The annual report of the Rio de Janeiro City Improvements Company, Limited, states that the accounts for the year 1873 show that a net sum of 15,417*l.* 16*s.* 3*d.* has been expended during the year in drainage and additional houses. The unappropriated balance of revenue amounts to 45,606*l.* 16*s.* 9*d.* Of this sum the directors recommend the distribution of 31,875*l.* by way of dividend for the half-year, at the rate of 7½ per cent. per annum (free of income-tax), leaving the sum of 13,731*l.* 16*s.* 9*d.* to be carried over. This dividend, together with that paid in October last, raises the payment for the whole year to 7½ per cent. upon the share capital.

Health of Liverpool.—A report on the health of Liverpool during the year 1873, by W. S. Trench, M.D., medical officer of health for the borough, has been issued in a printed form. From this it appears that the death-rate of the borough during the past year was equal to 25·8 per 1,000. There were 18,716 births and 13,042 deaths. The death-rate per 1,000 in Rodney-street and Abercromby was 20·2; West Derby, 21·5; the Toxteths, 22·3; Everton and Kirkdale, 23·8; Castle-street and St. Peter's, 29·4; St. Anne's and Lime-street, 30·0; Pitt-street and St. George's, 30·1; St. Paul's and Exchange, 31·6; Scotland, 31·8; and Vauxhall, 34·2.

The Patent Laws.—A meeting was held, on Monday evening last, in the rooms of the Social Science Association, in Adam-street, Adelphi, under the presidency of Mr. Thomas Webster, Q.C., when a paper was read on the above subject by Mr. John Coryton. A discussion followed, in which Mr. Frederick Hill, Mr. Charles Clarke, Q.C., Mr. J. Anderson Rose, Dr. Edgar, Dr. Ryalls, Mr. De Tracey Gould, and the chairman took part.

TENDERS

For new schools and offices, in the Greenwich District, at Upper Earl-street, Walmer-road, Plumstead, for the School Board for London. Mr. Robson, architect. Quantities supplied:—

Sheffield	£7,997 0 0
Thompson	7,860 0 0
Cullum	7,540 0 0
Jerrard	7,492 0 0
Cooper	7,460 0 0
Hill, Higgs, & Hill	7,334 0 0
Johnson	7,240 0 0
Newman & Mann	7,146 0 0
Kirk & Co.	6,693 0 0

For vicarage in Ashby-street, Clerkenwell. Mr. J. C. Hukins, architect. Quantities not supplied:—

Roberts, L. H. & R.	£2,734 0 0
Moreland & Nixon	2,695 0 0
Staines & Son	2,346 0 0
Elkington	2,050 0 0

For alterations to Mongeham House, Deal, for Mr. M. B. Thompson. Messrs. Whitley & Fry, architects. Quantities not given:—

Ansell & Cook	£1,314 16 6
Denne & Wise	1,178 0 0
Collew & Davis (accepted)	998 0 0

For finishing two warehouses in Wilderness-row, Goswell-street, Clerkenwell, for the Metropolitan Board of Works. Mr. George Vulliamy, architect:—

Nixon & Son	£2,100 0 0
Shurmur	1,989 0 0
Cullum	1,987 0 0
Greenwood & Son	1,975 0 0
Croaker	1,889 0 0
Wood	1,873 0 0
Forrest	1,823 0 0

For painting and other work at the Poplar and Stepney Sick Asylum, Bromley, Middlesex. Messrs. A. & C. Harston, architects. Quantities supplied:—

Riddall	£1,341 0 0
Nowlan	1,210 0 0
Derby	1,012 0 0
Palmer	999 0 0
Hopewell	990 0 0
Sheffield	989 0 0
Lanison & Knight (accepted)	813 0 0

For Bookbinders' Provident Asylum, Ball's Pond-road, Islington, N., new west wing. Messrs. McNab, Soul, & Pritchett, architects. Quantities supplied by Messrs. Batterbury & Huxley:—

Cohen	£1,560	0	0
Sheffield	1,435	0	0
Simpson & Baker	1,423	0	0
Moreland & Nixon	1,405	0	0
Nightingale	1,393	0	0
Tibbett, Jun.	1,388	0	0
Wick	1,367	0	0
Aldous	1,285	0	0
Crabb	1,248	0	0
Elkington	1,243	0	0
Sabey & Sons	1,243	0	0
Boyce (accepted)	1,227	0	0

For new Sick Asylum, Cleveland-street, Fitzroy-square, for the Central London Sick Asylum District. Messrs. John Giles & Gough, architects. Quantities by Mr. C. H. Goode:—

Oliver	£16,930	0	0
Staines & Son	16,680	0	0
Boyce	16,390	0	0
Kirk & Co.	16,250	0	0
Howard	15,745	0	0
Anscomb	15,763	0	0
Nibbet	15 397	0	0
Thorn	15,367	0	0
Grimwood	15,249	0	0
Hill, Higgs, & Hill	15,249	0	0
Elkington	15,135	0	0
Crockett	15,000	0	0
Rankin	14,950	0	0
Simpson	14,930	0	0
Bayes & Ramage	14,850	0	0
Wagner	14,700	0	0
Nightingale	14,643	0	0

Accepted for new bonded and free warehouses, for the Kendal Bonded and Free Warehouse Company, Limited, Kendal. Mr. Stephen Shaw, architect. Quantities supplied:—

Walling, Masonry, Arching, Excavating, Drains, and Slating.

Troughton	£3,046	0	0

Carpenter and Joiner.

Carter	1,732	0	0

Iron-founders.

Lees & Graham	1,043	0	0

Plumber and Smiths.

Airey & Tanner	272	10	0

Plasterer.

Steel	85	0	0

Painter and Glazier.

Hine	119	0	0

Cranes and Cut Heads.

Downes	542	2	0
	£6,839	12	0

For roads and sewers, Wandsworth-road. Mr. W. A. Murphy, architect:—

Thompson	£2,250	0	0
Batch	1,999	0	0
Jackson	1,850	0	0
Kebble	1,816	0	0
Harriss	1,665	0	0
Wainwright	1,650	0	0
Cole	1,524	0	0
Pearson	1,520	0	0
Riley	1,488	0	0
Carter	1,450	0	0
Hawks	1,350	0	0
Hopkins	1,336	0	0
Hancock (accepted)	1,273	0	0
Gardner	1,232	0	0
Hare	1,148	0	0

Accepted for new auction mart, auction rooms, and offices for the Cockermouth Auctioneering and Estate Agency Company, Limited, Cockermouth. Mr. Stephen Shaw, architect. Quantities supplied:—

Masonry, Paving, Excavating, and Drains.

Bolton	£1,889	0	0

Carpenter and Joiner's Work.

Robinson	1,555	0	0

Plumbing, Smith, Iron-founder, and Painter's and Glazier's Work.

Robinson	626	0	0

Slating.

Nanson	415	0	0

Plastering.

Steel	151	19	6
	£4,636	19	6

For Mr. S. A. Cail's offices, Quayside, Newcastle-on-Tyne. Mr. Gibson Kyle, architect. Quantities supplied:—

Reed, J. & N. R.	£6,062	0	0
Millar	6,006	0	0
Lowry, J. & W.	5,998	12	0
Elliott	5,538	0	0
Mitchison (accepted)	5,495	0	0
Hudspeth*	1,782	0	0

* Mason and Bricklayer only.

For work-rooms, stables, &c., in the Clapham-road, for Messrs. Wand & Co.:—

Young	£343	0	0
Snell	330	0	0
Liddicot	330	0	0
Prebble & Morley (accepted)	320	0	0

For rebuilding No. 28, Holles-street, Cavendish-square. Messrs. J. Young & Son, architects. Quantities supplied by Mr. Buzzard:—

Kelly, Bros.	£3,123	0	0
Brass	3,120	0	0
Ashby & Horner	3,027	0	0
Conder	3,000	0	0
Manley & Rogers	2,977	0	0
Lawrance	2,935	0	0
Nightingale	2,693	0	0

For alterations and additions to house and premises belonging to Mr. John Coppin, Marsham-street, Westminster. Mr. Henry Stephen Ridley, architect:—

Abbiss	£1,143	0	0
Mills	1,130	0	0
King & Son	1,110	0	0
Foster	1,075	0	0
Richards	974	0	0
Jopling & Co. (accepted)	940	0	0

For the Kettering Sewerage Works. Mr. R. W. Johnson, surveyor:—

Chappell	£15,420	0	0
Acock	10,090	0	0
Neave & Son	9,214	10	0
Hens[illegible], J. & G.	8,173	4	0
Walker	8,139	19	8
Branson	8,138	15	8
Moore	7,547	16	0
Barlow	5,825	0	0

For New Connexion chapel, West Hartlepool. Mr. Gibson Kyle, architect:—

Alderson	£2,480	0	0
Punton	2,136	19	9
Pybus	2,103	8	0
Bridges & Robson (accepted)	1,950	0	0
Coxon	1,943	18	9

Hot-air Apparatus.

Lewis & Co.	35	0	0

For new business premises, High Wycombe, for Mr J. G. Peace. Mr. Arthur Vernon, architect:—

Hunt	£2,090	0	0
Loosley	1,928	10	0
Spicer	1,890	0	0
Ward (accepted)	1,700	0	0

For alterations and additions to house and premises, Boston-road, Brentford. Mr. John W. Smithies, architect:—

Gibson	£1,088	0	0
Nye	820	0	0
Bostel	776	0	0

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